

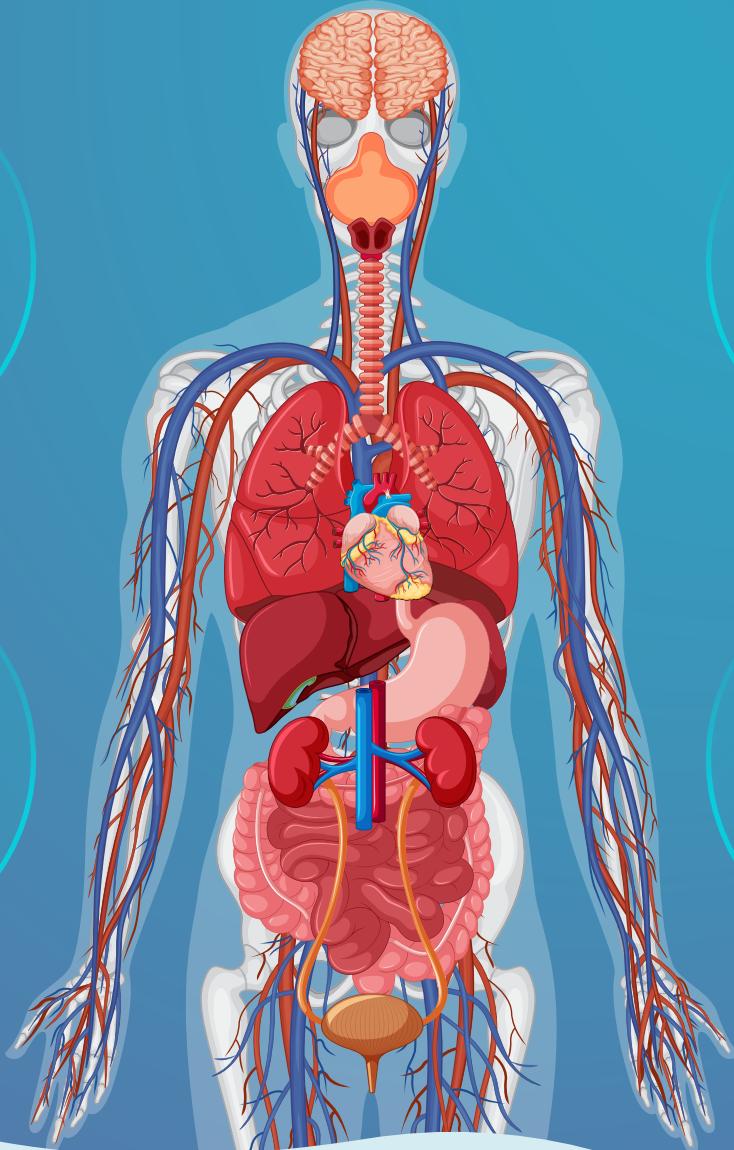
Diabetes and its Effect on Every System in the Body

Medically
Reviewed

Analysis of
12 systems

Tips for
T1D & T2D

Lifestyle
advice



Health Risks, Common Complications, Prevention, and Tips

Purpose

The purpose of this whitepaper is to provide an insight into how diabetes mellitus affects the human body by taking into consideration its 12 systems - skeletal, muscular, nervous, endocrine, cardiovascular, lymphatic, integumentary, respiratory, digestive, urinary, and reproductive (female + male) system.

Everyone living with diabetes knows that the condition affects blood sugar levels, but do you know how it affects your chances of having a child? Your teeth & gum health? Your breathing and sleeping patterns? The risk of having a heart attack? Hence, the body is a complex ecosystem where everything is connected, impaired insulin production affects every aspect of the organism. This might sound like a daunting and overwhelming thought to bear, especially for someone recently diagnosed. However, if not properly educated on the topic of how diabetes influences different systems and organs in the body, numerous complications and health risks can occur, that could have been easily prevented.

Based on this, we've gathered the most important aspects in which the condition influences the body and suggested solutions & preventative tips to implement in everyday life, all aiming to avoid those problems.



The content of this whitepaper has been medically reviewed by **assoc. prof. Dr. Radka Savova, MD, Ph.D.** Prof. Savova is a pediatrician and an endocrinologist with over 30 years worth of experience in diabetes treatment. She specializes in the diagnosis and treatment of childhood diseases, pediatric endocrinology, growth, and development problems. Assoc. Prof. Savova heads the Department of Diabetes at the Children's Hospital SBAL "Prof. Dr. Ivan Mitev" in Sofia and is also a member of the **Medical Advisory Board** of Sirma Medical Systems.

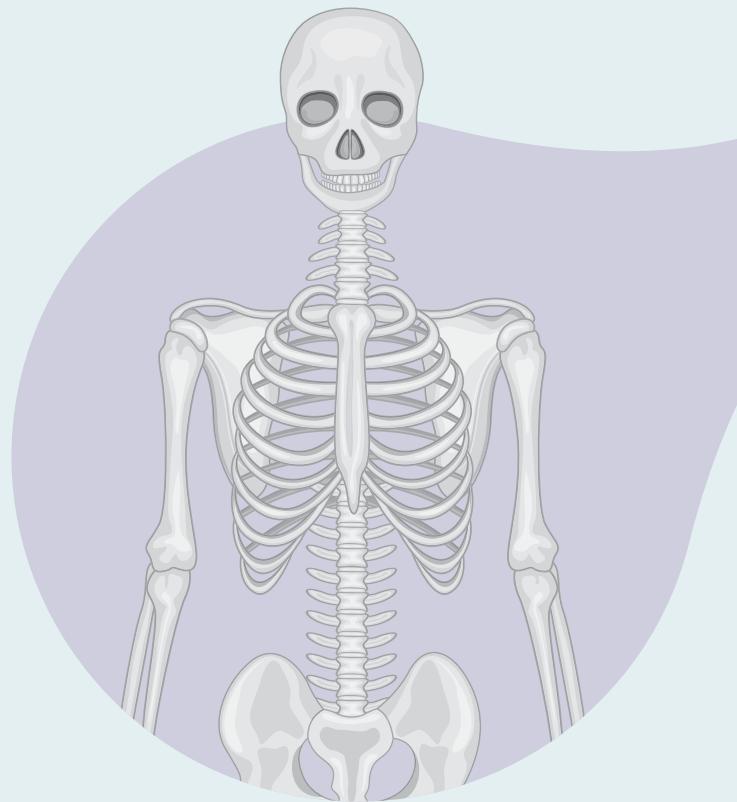
Table of contents

| | |
|---|----|
| Skeletal System | 3 |
| Muscular System | 6 |
| Nervous System | 8 |
| Endocrine System | 10 |
| Cardiovascular System | 13 |
| Lymphatic System | 15 |
| Integumentary System | 17 |
| Respiratory System | 19 |
| Digestive System | 21 |
| Urinary System | 23 |
| Reproductive System (Female and Male) | 25 |
| Conclusion | 28 |
| References | 29 |

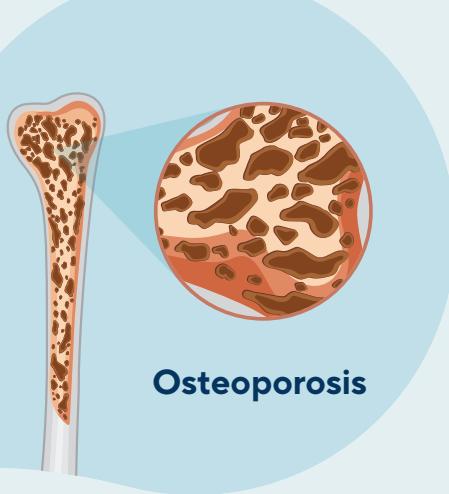
Skeletal System

Several factors affect bone strength and quality, such as calcium, vitamin D, and certain hormones. People with diabetes, especially type 1, tend to have lower vitamin D levels than people without the condition. Due to this, the body has a harder time absorbing calcium, resulting in **low bone density**. This increases the risk of fractures and makes the healing process longer.

Moreover, elevated blood sugar levels can also lead to chronic inflammation, which directly affects the bone's strength. Weak and hollow bones that break easily are the signs of a condition called **osteoporosis**. It affects primarily the hips, spine, and wrists, in people in their 40s and older.



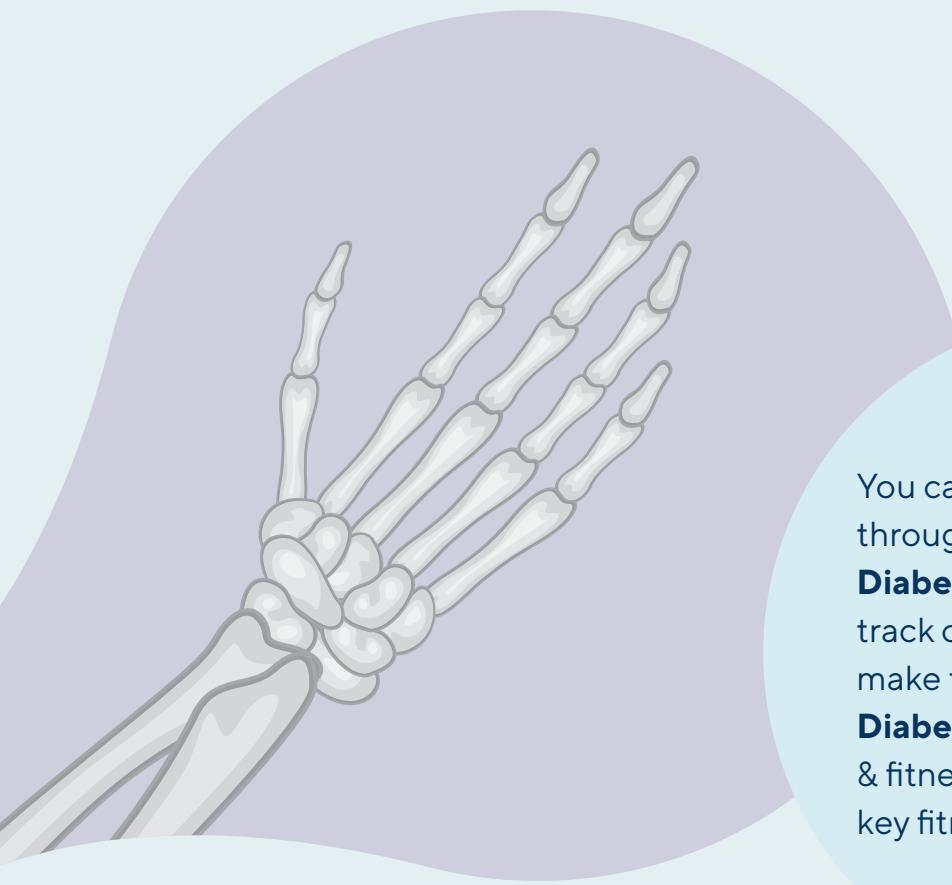
"Almost 20% of T1D patients between the ages of 20–56 years meet the criteria for being osteoporotic."



Usually, osteoporosis goes hand in hand with another disease called **osteoarthritis** – a joint disorder that involves the breakdown of cartilage. Type 2 diabetes increases the chances of developing these health issues due to obesity, which puts a strain on the whole skeletal system.

"The risk of hip fracture is nearly twice as high for diabetes patients as for people without diabetes."

One of the possible health risks of unmanaged diabetes for a long period of time can be **limited joint mobility**. The condition is also known as diabetic hand syndrome or diabetic cheiroarthropathy. People with this condition have a hard time moving their hands as the small joints start to become stiff.



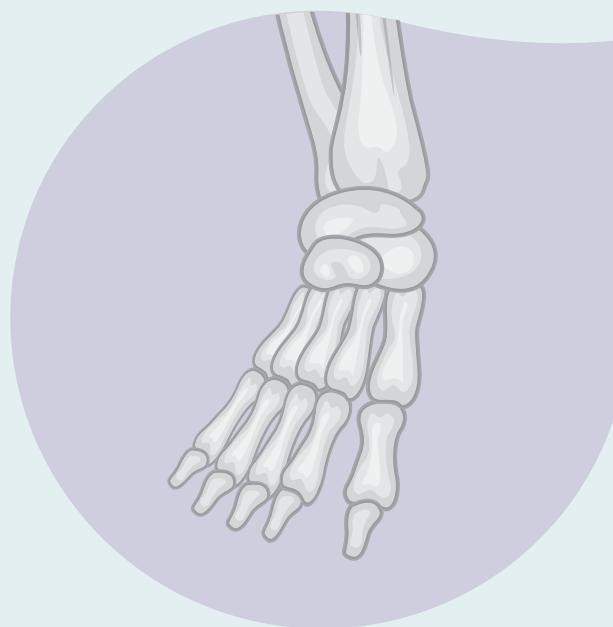
You can log your physical activity throughout the day in the **Diabetes:M** app as well as keep track of weight measurements. To make the process even smoother, **Diabetes:M** syncs with most health & fitness apps and transfers all the key fitness data for you.

With time, finger movement becomes limited and the skin on the hands can become waxy and thickened. This condition can also occur in other parts of the body, such as the feet, ankles, and shoulders.

"Physical therapy and improved blood sugar management are recommended as treatment methods."

Type 1 and Type 2 - do they affect the skeletal system in the same way?

There is a pretty big difference in how each type influences the bones in the body. T1D affects the microarchitecture of the bone by **decreasing** its mineral density. However, some studies have found that T2D **increases** mineral density. Unfortunately, this does not exclude the risk of developing health complications because type 2 diabetes still affects the overall bone quality.



Preventative Measures

How to prevent skeletal complications?

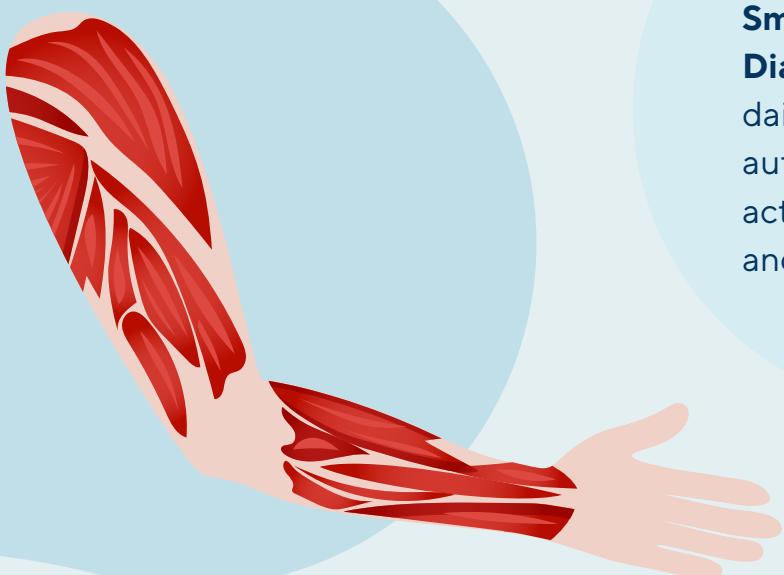
- Keep blood glucose levels within the range
- Consult with a health care specialist to make sure your body does not lack essential vitamins and nutrients, like calcium and vitamin D
- Stay physically active and include weight-bearing exercises in your routine
- Remain in a healthy BMI (Body Mass Index)

Muscular System

Diabetes can cause problems in the muscles of your fingers, hands, neck, or feet. Carpal tunnel syndrome, for example, is frequently seen in people with diabetes, as it triggers a **catching or locking of the fingers**. People with T1D & T2D often have problems with cholesterol and this is why doctors prescribe them statins. Muscle pain (myalgia) is a side effect of this medication and reportedly may affect 1 in 10 cases.



Furthermore, hypoglycemia or electrolyte imbalances may cause muscle cramps. In some rare cases, muscle infarction can be a result of **ischemia** (a condition in which the blood flow (and thus oxygen) is restricted or reduced in a part of the body) or diabetic **ketoacidosis** (when your body doesn't have enough insulin to allow blood sugar into your cells for use as energy). Clinicians advise that a muscle biopsy may be needed to confirm some of the diagnoses.



Did you know that the **Smart Assistant** feature of **Diabetes:M** learns your daily routines and logs automatically your physical activity throughout the day and even analyzes it?

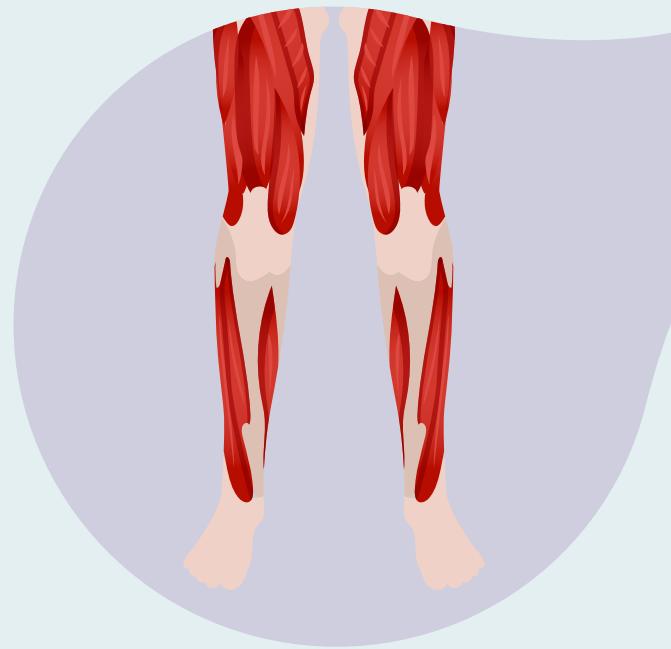


How does diabetes cause muscle loss?

Uncontrolled diabetes can cause weight loss with increased appetite, particularly with new-onset type 1 diabetes. Adults with type 1 diabetes typically have a long latent period before diagnosis and are likely to have protracted symptoms of high blood sugar, also known as "hyperglycemia".

"Diabetic motor neuropathy can affect any muscle – singly or symmetrically, one muscle or several."

Although patients with poorly controlled or undiagnosed type 2 diabetes are typically overweight, they can present with weight loss as well. Some patients with T2D can be faced with diabetic **neuropathic cachexia**, an unusual and poorly understood syndrome characterized by profound weight loss (as much as 60 percent of body weight) and often severe neuropathic pain of the anterior thighs.



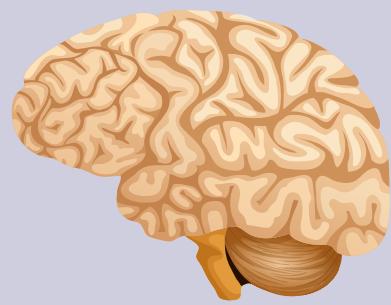
Preventative Measures

Ways to look after your muscles:

- Monitor the vital signs: blood pressure, pulse
- Chart weight regularly
- Perform regular health checks
- Screen for diabetes by blood and urine tests
- Make sure to eat a healthy and nutritious diet
- Keep track of the types of exercise you perform

Nervous System

Both type 1 and type 2 diabetes can cause nerve damage (**neuropathy**). It occurs to the sensory (feeling) and motor (movement) nerves of the legs and feet, arms, hands, chest, and stomach, and to the nerves that control the actions of body organs. Based on this, one can note that almost all of your nervous system is at risk if diabetes is **left unmanaged**.



"Half of all people with diabetes have nerve damage."

You may experience **mild numbness or sensitivity** in some parts of your body or pain in your feet and legs. These are common signs that you might have a nerve problem. Other signals that nerves are not functioning correctly are if you have **difficulty with coordination** when walking or if you feel bloated or full. A disturbance in your central nervous system can affect your perception of heat, cold, and pain, which could make you more susceptible to injuries. So, make sure to take really good care of every cut.



Preventative Measures

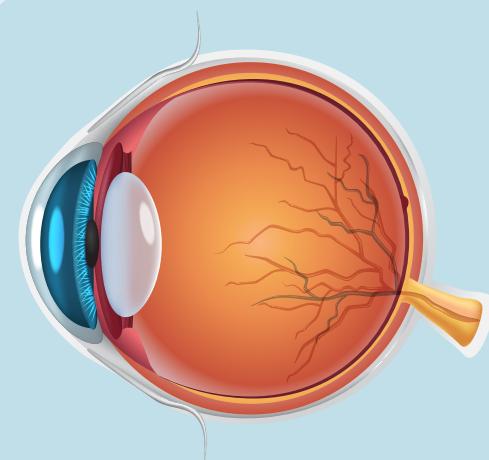
Tips to minimize the risk of developing nerve damage:

- Make sure to keep your blood sugar levels in the target range.
- Avoid excessive drinking or smoking.
- Get regular screenings (A1C lab test at least twice a year).
- Protect and take good care of your feet (check them every day for sores, cuts, or breaks in the skin as well as calluses, blisters, red areas, swelling, ingrown toenails, and toenail infections).
- Be careful when exercising as most injuries occur at that time.

The eyes are also part of the nervous system, which explains why so many people with diabetes have vision problems or eye damage to some extent. Other common diabetic eye diseases are:

- **Diabetic Retinopathy** (partial vision loss)
- **Macular Edema** (influences the sharp vision and may lead to partial vision loss or blindness)
- **Cataracts** (cloudy vision and faded colors)
- **Glaucoma** (loss of side vision)

If you happen to have blurry vision for a few days it might be because your blood sugar levels are high. High glucose may change the body's fluid levels or cause swelling in the tissues of the eyes that are responsible for eye focus.



Symptoms indicating eye problems for people with diabetes

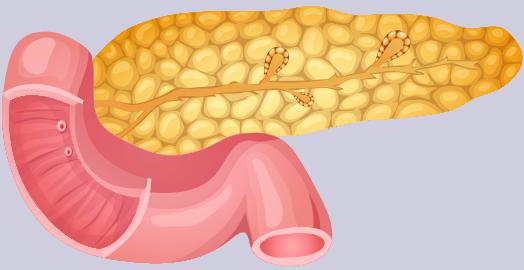
- Your vision quality changes frequently
- Blurry vision
- Vision loss
- Faded colors
- Loss of side vision
- Seeing dark spots
- Flashes of light



Did you know that the Premium version of **Diabetes:M** allows you to log lab results like HbA1c, Lipid tests, Metabolic tests, and more?

Endocrine system

Your pancreas as part of the endocrine system releases regulatory hormones. In a case when your body cannot respond accordingly to them, some type of health problem occurs. One of the most common endocrine disorders in the world is called **Diabetes Mellitus**. People can have Type 1 Diabetes (T1D), Type 2 Diabetes (T2D), Gestational Diabetes (GD - develops only during pregnancy), pre-diabetes, or LADA (Latent Autoimmune Diabetes in Adults).



"The most common types of diabetes are 1 and 2."



The Bolus Advisor feature of **Diabetes:M** calculates the amount of insulin your body needs, depending on the food you've consumed, exercise you've had, and even based on whether you are sick or not!

T1D is an autoimmune disorder where the person fully relies on synthetic **insulin** since their own body attacks its endocrine system and the **pancreas** loses all of its insulin-producing cells.

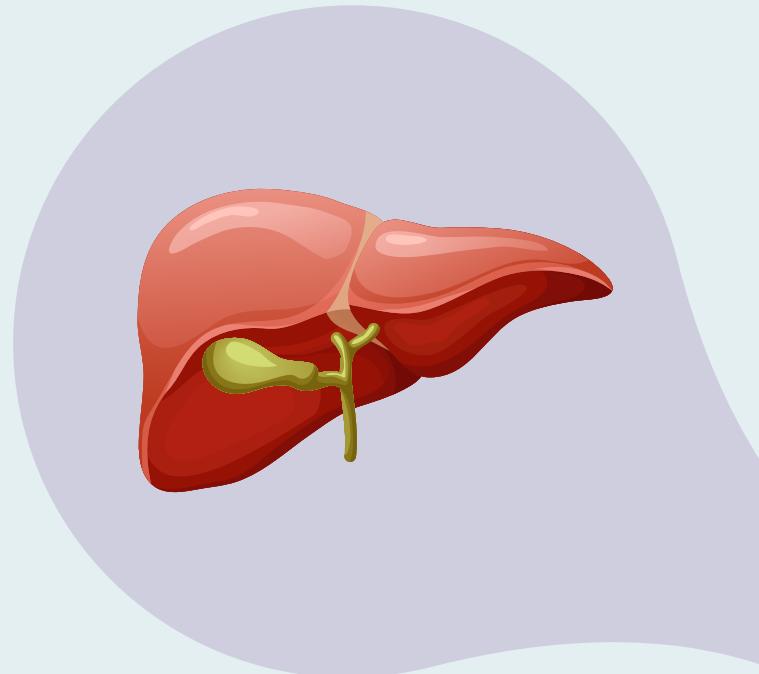
T2D is a chronic condition that develops over time when the person's body becomes **resistant to insulin**. People with T2D can help their pancreas function to regulate blood sugar by dieting, exercising, keeping track of blood sugar levels, and, of course, administering insulin when needed.

The pancreas is an exo-endocrine gland that contains a collection of cells called the Islets of Langerhans which release both insulins (for blood sugar levels & fatty acids decrease) and glucagon (for blood sugar levels & fatty acids increase).

"The liver is another endocrine organ that helps with the regulation of blood sugar."

The **liver** is another endocrine organ that helps with the regulation of blood sugar. One of the liver's most important roles consists of its function to respond to insulin and glucagon by taking up and releasing glucose from the blood. It is also responsible for releasing and removing **cholesterol** from the bloodstream.

Its ability to stabilize blood glucose also activates when you exercise. Although the liver is the biggest internal organ in the human body, it can only store a certain amount of **glucose**. If you keep doing physical activity, the body will eventually start breaking down fats that the liver converts to an alternative power source called ketones. People who have diabetes have to be cautious when doing exercise so they don't develop diabetic ketoacidosis (DKA) which causes the blood to become **acidic**.



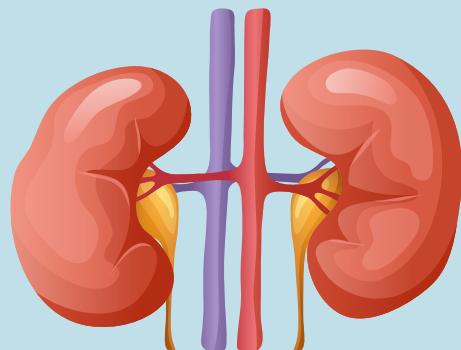
Preventative Measures

Tips to help look after your liver:

- Keep blood glucose and blood pressure levels within the recommended range
- Maintain a healthy weight with a balanced diet and regular exercise
- Keep "bad" cholesterol (low-density lipoprotein) and triglycerides levels low
- Limit your alcohol consumption

"There are 2 adrenal glands sitting on top of the kidneys."

There are 2 **adrenal glands** sitting on top of everyone's kidneys. They are responsible for releasing hormones that respond to stress (cortisol), regulating blood pressure (aldosterone), and taking care of your immune system and metabolism (Epinephrine (Adrenaline) and Norepinephrine (Noradrenaline)).



In case of an emergency, when your body is under stress it needs extra energy to escape a dangerous situation. This is where the so-called **adrenaline** (medically known as epinephrine) triggers the release of glucagon from your liver and raises your **blood pressure**. When aldosterone is released into the body it sends signals to the kidneys to absorb more sodium into the bloodstream and potassium into the urine. This is how the hormone regulates your blood's pH by controlling the electrolyte levels in it. Additionally, epinephrine and norepinephrine assist in **glucose metabolism**.



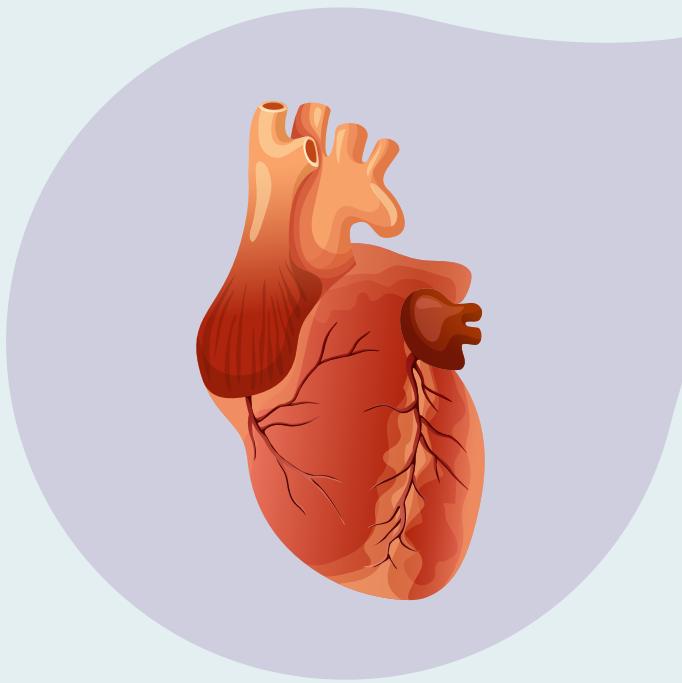
Preventative Measures

How to limit your chances of developing complications like Chronic Kidney Disease (CKD):

- Limit your sodium intake
- Manage your blood sugar levels
- Check your blood pressure regularly
- Get your A1C test at least twice a year

Cardiovascular System

Up to 65% of people with diabetes are affected by some form of coronary disease. The number one risk factor for this is **obesity**. Living with excess weight usually involves another risk factor - high levels of cholesterol (plaque found on the insides of the arteries, making it harder for blood to pass through), limiting the flow of oxygen and increasing blood pressure. High blood pressure, also known as **hypertension**, can lead to a blood vessel bursting or being blocked, due to the cholesterol in it. When occurring in the brain, this type of injury is called a stroke and when in the heart - a heart attack.



"Up to 65% of people with diabetes are affected by some form of coronary disease. The number one risk factor for this is obesity."

Common primarily for T2D, obesity can also lead to **heart failure**, because of the constant stress the heart and the whole cardiovascular system are under. Furthermore, obesity also plays a major role in insulin sensitivity in the body. According to research, overweight individuals are prone to having higher amounts of non-esterified fatty acids, glycerol, hormones from the thyroid and pancreas, and pro-inflammatory cytokines that could participate in the development of **insulin resistance**. Naturally, this makes it harder to control blood sugar levels, leading to possibly life-threatening conditions like hyperglycemia.

"Coronary artery disease is caused by the buildup of plaque in the walls of the arteries that supply oxygen and blood to the heart."

There are some mechanisms by which **hyperglycemia** can contribute to the development and progression of diabetic heart failure. Such as:

- **Impaired Microvascular Endothelial Function** (trouble protecting the body against atherosclerosis and thrombosis.)
- **Abnormal Cardiac Metabolism** (shift myocardial utilization of glucose toward less efficient fatty acid oxidation)
- **Increased Myocardial Fibrosis** (an increased quantity of collagenous scar tissue in the heart)



Did you know that the **Diabetes:M** app lets you log blood pressure and cholesterol level readings? This way, you can have a 360-view of all key indicators that affect your cardiovascular health.



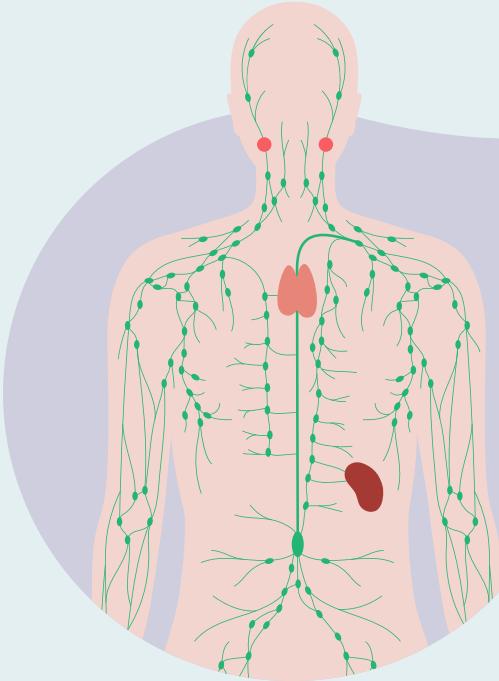
Preventative Measures

How to prevent the risk of possible complications?

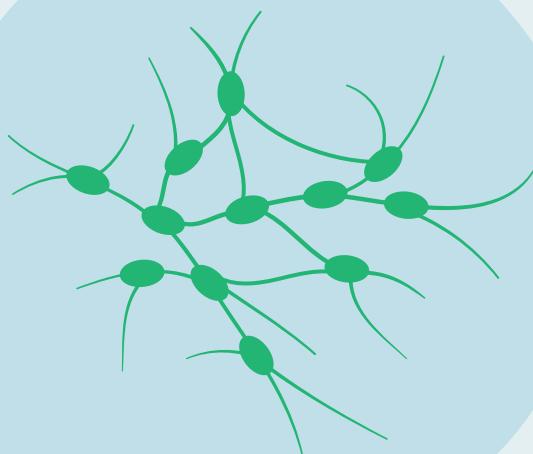
- Keep blood sugar levels within the range
- Stay physically active
- Eat a healthy and nutritious diet
- Limit salt intake
- Monitor blood pressure levels
- Have annual check-ups with a cardiologist

Lymphatic system

The lymphatic system is largely connected to the circulatory system. It consists of an extensive network of vessels, nodes, and ducts that circulate a **fluid called lymph**, in a way similar to blood. The lymph plays an essential role in the **immune system** of the body as it absorbs fats and fat-soluble nutrients, thus maintaining the fluid balance of the organism.



“When the lymphatic system isn't operating as it should be, the immunity of the body plummets, causing people with diabetes (PWD) to be much more susceptible to infections.”



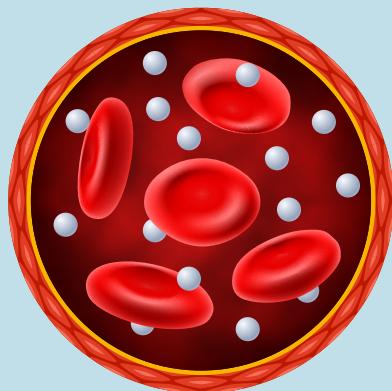
The way diabetes affects this system is by causing **lymphedema** - damage to the vessels or any other part of the system, therefore disrupting its function. This can cause damage to the connective tissue and skin. When the lymphatic system isn't operating as it should be, **the immunity of the body plummets**, causing people with diabetes (PWD) to be much more susceptible to infections.

"Diabetic alterations of blood vessels have been well studied, but much less is known about the lymphatic system."

Hyperglycemia is the main cause of lymphedema and other complication for the system. Despite this subject still being an area of ongoing research, scientists have found that well-managed blood sugar levels help normalize glycemia, thus restoring lymph flow.

Important factors to keep in mind:

- Type 2 diabetes may cause leaky lymphatic vessels, leading to obesity, dyslipidemia, atherosclerosis, and edema.
- Dietary sources of L-arginine, such as meat and dairy products, may help reduce the permeability of lymphatic vessels.
- Drugs like cilostazol and other PDE3 inhibitors may be used to restore lymphatic vessel integrity in the future.



To make diabetes management feel like a breeze, **Diabetes:M** syncs with numerous glucose meters via Bluetooth, helping you store blood sugar data in one place.

Integumentary system

The skin is the largest organ in the body. Due to the high blood sugar that causes dehydration, your skin can become dry and crack easily.

Unmanaged diabetes can lead to other serious skin conditions:

- **Diabetic Dermopathy** (small lesions or spots on the skin)
- **Necrobiosis Lipoidica Diabeticorum** (NLD – a rare diabetic skin rash on the shins)
- **Diabetic Blisters** (usually seen on people who have diabetic neuropathy)
- **Eruptive Xanthomatosis** (a rare diabetic skin condition that occurs in people with poorly managed diabetes who have high lipids, high triglycerides, and high cholesterol)



The Injection & Test Site graphics feature of **Diabetes:M** allows you to keep track of the rotation of blood pricks on the body, as well as that of insulin injection spots.

Keep yourself hydrated and moisturize your skin gently. In the areas where your skin folds (between fingers and toes, the groin, armpits, and corners of the mouth) be extra cautious because this wet and warm environment is the ideal prerequisite for the development of fungal, bacterial, or yeast infections.

"Diabetes can cause changes in the small blood vessels. These changes can cause skin problems called diabetic dermopathy."



The **feet** can be an extra dry part of your body, where a lot of dry and dead skin develops. If not taken care of regularly, calluses might form. These can become infected or develop ulcers.

If you have any suspicion that you have an ulcer, visit a doctor immediately. This will significantly lower the risk of losing a toe or even your foot.



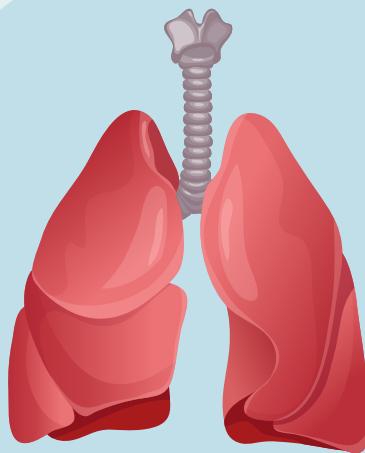
Preventative Measures

Tips on how to take good care of your skin:

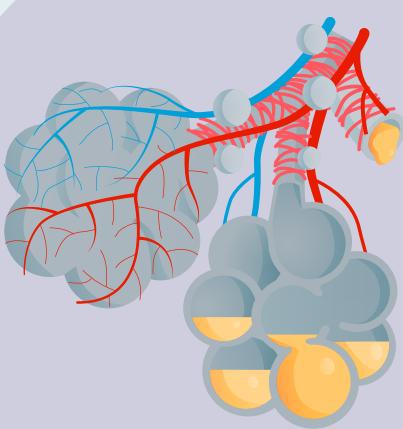
- Keep blood sugar levels within the range
- Keep your skin clean and dry
- Moisturize if needed to prevent dryness but be careful with the skin folds
- Use a moisturizer that has simple ingredients (preferably dermatology tested)
- Do not scratch dry and itchy skin to prevent opening it up for fungus and bacteria to settle there
- Avoid showering with boiling water as it can make your skin extra dry
- Do not take bubble baths if your skin is already dried out
- Use a humidifier if you live in a dry and hot region
- Be extra cautious to avoid any bruises, cuts, cracks, burns, infections, etc.
- Take care of your feet by regularly removing dead skin and moisturizing them if needed. Also, wear comfortable shoes that fit you well.
- Visit a dermatologist in case you can't handle any skin problems yourself

Respiratory System

Breathing problems may not occur often for people with diabetes, but when they do, **immediate action is required** because they can be a sign of a serious issue. For example, rapid or impaired breathing can be a symptom of **ketoacidosis** - extremely high blood sugar levels that cause the release of an abnormal number of ketones into the bloodstream due to the lack of enough insulin. However, this isn't the only health complication connected with the **respiratory system**, others can lead to further chronic conditions.



"People with type 1 diabetes have a 62% greater likelihood of having any respiratory disorder than those without diabetes."



Pneumonia is the most common complication regarding the respiratory system, no matter if diabetes is present or not. The problem for PWD isn't catching pneumonia but fighting it off once it has developed. Why? Because increased blood glucose levels make for fewer **white blood cells**. This weakens the immune system, making it harder for the body to fight the infection. If not treated in time, this can lead to serious **organ damage** and **fatal health complications**. This is why when people with diabetes develop pneumonia, they tend to spend longer time under medical supervision and experience stronger symptoms.

"People with type 2 diabetes have a 38% greater likelihood of having any respiratory disorder than those without diabetes."

Impaired breathing can be the reason for another health issue - **sleep apnea**. The cause of this disturbance is found in the muscles in the back of your throat. When they relax too much, normal breathing is disrupted, causing it to stop and start in an unusual pattern. Why is this an issue? Because this increases the amount of carbon dioxide in the bloodstream leading to insulin resistance, therefore making it harder to control blood sugar levels.



Busy everyday life can make it hard to remember to have a blood glucose test every few hours, that's why **Diabetes:M** has a detailed Reminders system, that alerts you when it's time for a check.



Preventative Measures

How to prevent respiratory problems?

- Quit smoking
- Get a pneumonia shot
- Keep blood sugar levels within the range
- Don't ignore flu-like symptoms, take measures from the beginning - consult with a doctor if you experience impaired breathing

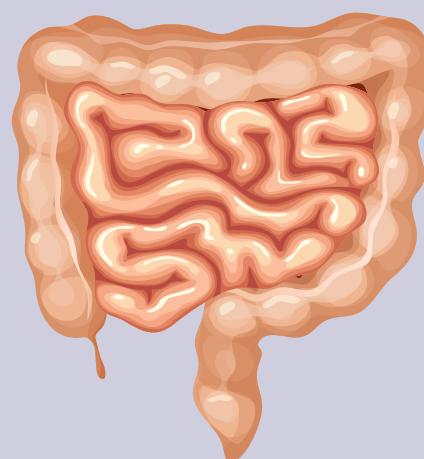
Digestive system

Increased thirst is one of the symptoms of diabetes. If you have temporary or prolonged mouth dryness, you might have also developed **polydipsia** (extreme thirst).

How to recognize the symptoms? Look out for persistent and unexplained thirst, regardless of how much liquids you drink or when you urinate more than 5L per day.

Oral health: People with diabetes who don't manage it well are at an increased risk of tooth decay and gum infections.

The small blood vessels that bring essential molecules to your teeth are susceptible and can be easily damaged. If you have any **dental or gum infection** it might lead to high blood glucose levels.



See a healthcare professional if you are feeling thirsty for no particular reason for a few consecutive days.



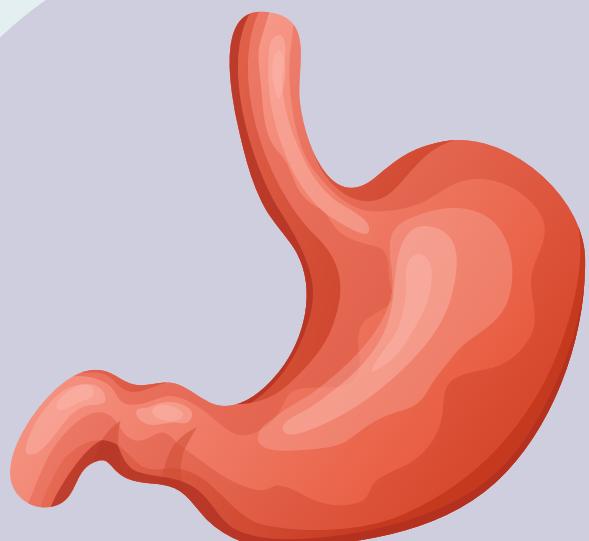
Preventative Measures

Tips on how to reduce oral problems:

- Brush your teeth at least twice a day (+ floss once per day)
- Dentists recommend using a soft toothbrush
- Visit your dentist at least twice a year for check-ups



The Recipe Analyzer feature of **Diabetes:M** lets you analyze home-cooked dishes so that you don't have to spend time calculating the nutritional information for each product of the recipe.

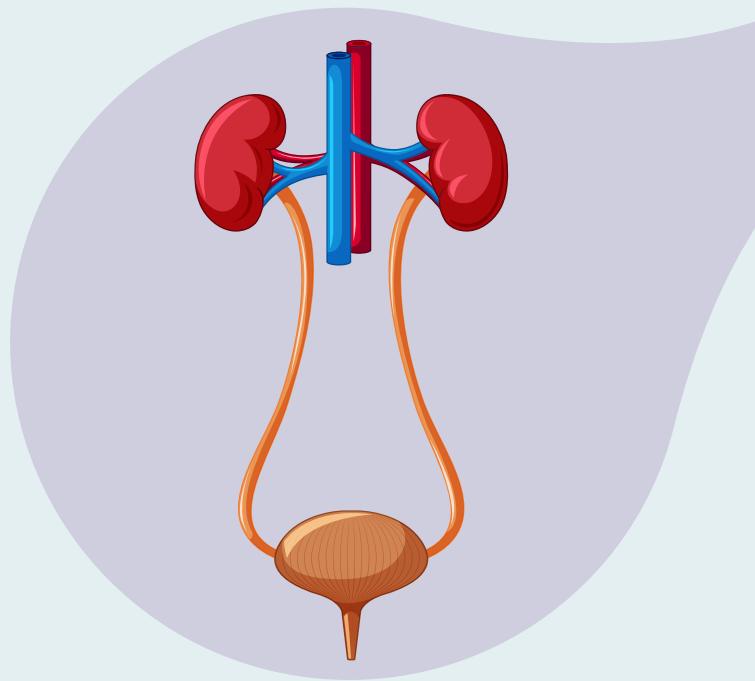


“High blood sugar can lead to gastroparesis, a condition that affects how you digest your food.”

High blood sugar can lead to **gastroparesis**, a condition that affects how you digest your food. It consists of delayed gastric emptying of food from the stomach which can cause bloating, heartburn, vomiting, and nausea. If food isn't moved from the stomach into the small intestine this might result in acid reflux, abdominal pain, and even weight loss in severe cases.

Urinary system

The urinary system and diabetes are also closely connected. Its main organs and vessels are the ureters, bladder, and urethra. If your blood glucose levels are too high even for a short period, they can promote bacterial growth which can raise the risk of **urinary tract infections** (UTIs) or thrush developing. UTIs involve the urethra (a condition called urethritis), kidneys (a condition called pyelonephritis), or bladder (a condition called cystitis).



"People with diabetes are also at higher risk of developing yeast infections (thrush) if there is glucose in their urine."

Recent studies among 1M people with diabetes show that **women are more likely** to develop a UTA than men. This is because of the short length of the urethra, the tube taking urine from the bladder out of the body. Symptoms of such infections include frequent urination, pain, or a burning sensation during urination, and the urine might be cloudy or reddish.

The long-term effects of uncontrolled diabetes might be damage to nerves controlling the bladder, resulting in difficulty urinating or urinary incontinence. People with diabetes are also at higher risk of developing yeast infections (thrush) if there is glucose in their urine. This is also the perfect environment for fungal infections to grow. Be aware that any kind of bacteria in your body is resistant to treatment, so make sure to keep track of your blood sugar levels.

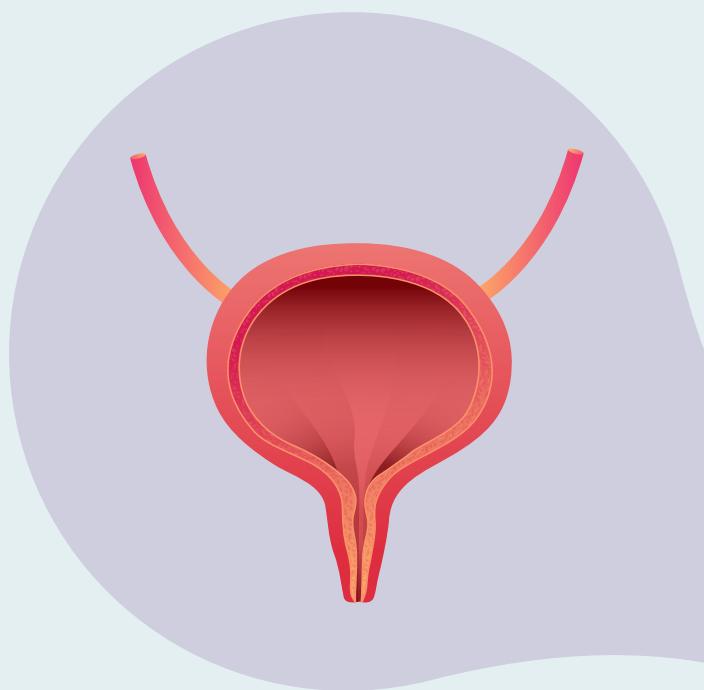
Bladder Dysfunction

More than half of adults with type 2 diabetes have bladder problems. Studies have shown that the most common of these, which are often interrelated, are:

- **Overactive bladder** - When bladder muscles spasm or contract even when they contain very little urine. This leads to urinary urgency - the feeling of needing to pee now.
- **Polyuria** - The excessive production of urine, generally more than 2.5 to 3.0 liters per day
- **Nocturia** - Waking up frequently during the night with the need to pee
- **Incontinence** - Leakage of urine



The Graphs & Charts features of **Diabetes:M** allow you to understand better certain trends happening in the body by providing detailed visuals of your glucose history, average carbs per meal, insulin sensitivity, and more.



Preventative Measures

Ways to keep your urinary track healthy:

- Keep your blood sugar in the recommended range
- Go to the toilet every time you need to go - do not hold
- Stay hydrated at all times
- Avoid using skin irritating products
- Wipe front to back during bathroom visits
- Use cotton blend underwear

Reproductive systems

Female

The fertility of women with diabetes is affected in a couple of different ways due to their diabetes. It all depends on a variety of factors like being overweight, being underweight, having diabetic complications, and more, but the main complications regarding reproductive health that can occur are:



- **Polycystic Ovary Syndrome (PCOS)**, which is a hormonal imbalance causing irregular periods leading to lower fertility rates. The condition is largely associated with obesity and T2D.
- **Premature menopause**, which affects women with T1D, means that their monthly menstrual cycle terminates before they've reached their 40s. Type 1 is also associated with delayed puberty and menarche, downsizing the window of fertility for women even further.
- **Irregular or absent periods**, also known as anovulation. This means that the ovary did not release an egg into the fallopian tube that month, limiting the chance of pregnancy.
- **Endometrial cancer** (uterine cancer) is common in women with T2D and PCOS. Early treatment of the disease is paramount, as it can lead to infertility.

"When diabetes is well managed, you have a lower risk of fertility issues than when it is not under control."

Furthermore, clinicians advise that women that are planning on becoming mothers soon, start preparations for pregnancy in advance. It's important to have a health assessment beforehand, to know whether their diabetes management methods require adjustment as well as to inform themselves of the possible complications or health risks. It is of high importance for expecting mothers to maintain their blood sugar levels in range throughout the pregnancy, to ensure a healthy birth.

"For couples where the woman is 30 or under, fertility help should be sought after trying to conceive for a year. For couples where the woman is 35 or older, help should be sought after six months."



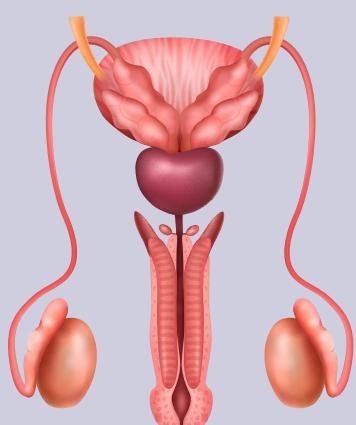
Preventative Measures

How to minimize the risk of fertility issues?

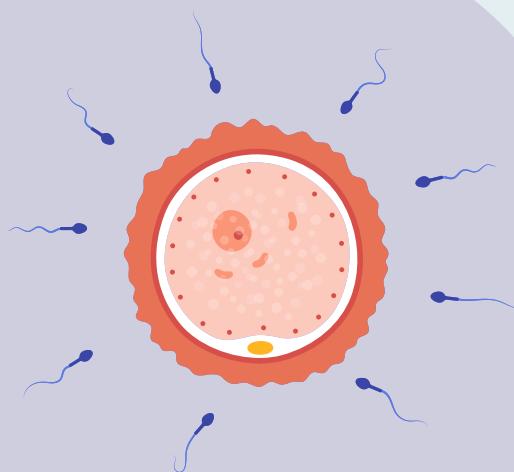
- Visit your gynecologist once a year
- Limit the intake of highly processed foods
- Get enough sleep and try to avoid stress
- Consult with a fertility specialist before starting oral contraception
- Keep your blood sugar levels in the range

Male

When it comes to fertility in men, uncontrolled diabetes can cause nerve damage or problems with the blood supply of the penis, making it difficult to perform intercourse. Moreover, diabetes could also affect the **spermatogenesis** of a man by disturbing epigenetic dysregulation. This can be inherited through generations, increasing the chance of passing on the condition to offspring.



Obesity and uncontrolled diabetes have a negative effect on sperm parameters and are associated with low testosterone levels. This can lead to low libido, erectile dysfunction, and infertility.



Did you know that the **Diabetes:M** app lets your clinician monitor your health data remotely? This saves you the effort of visiting them in person for routine lab result examinations or blood sugar trend analysis.



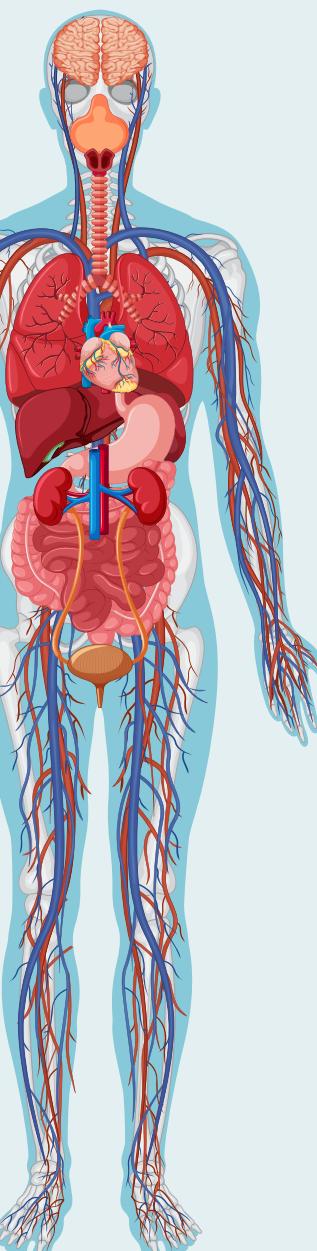
Preventative Measures

Tips to help prevent impaired spermatogenesis naturally:

- Get enough sleep each night
- Quit smoking
- Avoid excessive alcohol and drug use
- Exercise regularly
- Limit stress as much as possible
- Get enough vitamin D

Annual screening tests with a healthcare provider are essential, for people planning on expanding their family. When diabetes is well managed and possible health complications are caught in the beginning due to good communication between patient and clinician, fertility risks grow smaller, and conceiving is not a problem.

Start your journey to a healthier lifestyle with the help of **Diabetes:M!**



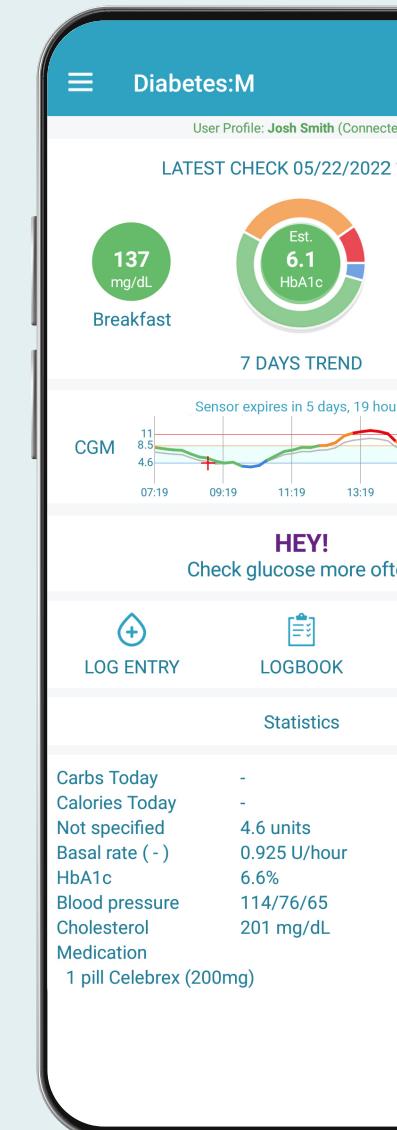
Log all types of blood sugar data in one place and receive bolus calculations.

Monitor key health vitals like cholesterol, HbA1c, blood pressure, etc.

Track blood sugar pricks & insulin injection spots on full-body diagrams.

Receive nutritional data for homecooked meals or store-bought foods.

Analyze graphs & charts on glucose history, insulin totals, and more.



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Disclaimer: This document is for informative purposes only. **Always consult with your healthcare provider** when considering changes in your lifestyle or diabetes management methods.

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The content of this whitepaper was kindly brought to you by **Diabetes:M's marketing team** and medically reviewed by **Assoc. Prof. Dr. Radka Savova, MD, Ph.D.**