

SWIMMING SPECIAL

& other water activities

**How swimming affects
diabetes management**

**IP Ratings explained -
Is your medtech waterproof?**

**Top 10 tips for wearing a
sensor in water**

How best to protect a CGM

A frequent concern to CGM wearers is the issue of getting the sensor wet. Whether it's in a hot tub, in a spa, in the sea, on water rides, playing water sports or any other water activity.

We ask, what are the risks of wearing a sensor during water activities and how can we minimise these?



NEED TO KNOW: SWIMMING WEARING A SENSOR

Swimming is the number 1 exercise activity carried out by persons with diabetes and is very popular in the summer months along with other water activities, especially on holidays.

There are lots of health benefits to be gained from swimming. All types of swimming will involve the use of muscles, the heart and lungs, giving a full body workout and this can have a positive impact on diabetes management and overall wellbeing.

With some planning most persons with diabetes should be able to enjoy a swim.

How does swimming affect glucose levels?

Swimming is a type of aerobic exercise and the effect of swimming on glucose levels will depend largely on the level of activity, or enthusiasm, involved.

It's also worth bearing in mind that levels can differ between individuals and for some levels may increase whilst for others levels can fall.

Gentle swimming, splashing in the sea and relaxing on a lilo are unlikely to affect glucose levels on their own.

However, a concerted effort when sustaining a number of lengths, participating in a water aerobics class, competing in a charity swim marathon or other vigorous water activity such as surfing, may cause glucose levels to drop. This comes with an increased risk of having a hypo.

Additionally, if the activity is performed in a hot climate or heated environment, this can also have an effect. Insulin sensitivity is likely to increase meaning that there is more of a risk of experiencing low glucose levels and hypos.

It can be difficult to spot the symptoms of a hypo when swimming as exertion and having a hypo can feel fairly similar.

Insulin sensitivity

Insulin sensitivity refers to how sensitive the body's cells are in response to insulin.

High insulin sensitivity allows the cells of the body to use blood glucose more effectively, reducing blood sugar levels.

How can I manage my diabetes when swimming?

If you're planning on making swimming a regular activity, it may take some trial and error with your diabetes management to find the approach that suits your individual needs.

It is generally suggested that swimmers with diabetes check their blood sugar levels every 30 minutes or thereabouts. This is a good starting point to discover the level of insulin on board (IOB) that you will personally need to manage your diabetes and avoid hypos.

You may be surprised that some swimmers suggest that IOB needs to be around 12 mmol/L before starting a reasonably strenuous swim.

If you manage your diabetes with insulin by multiple daily injections (MDI) then if you plan to swim within 2 hours of having a meal, you may choose to inject less bolus insulin when calculating your dose for this meal.

If you normally wear a pump, then unless the pump is waterproof or in a waterproof case, you will need to disconnect this from the tubing and infusion set. It's also best to cover the infusion set with a cap or some tape and to keep the pump in a safe place where there's no risk of it getting wet.

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Are sensors waterproof?

Sensors contain electrical elements and must undergo tests for an IP classification. They are usually water-resistant to IP67 or IP68 standard. This isn't the same as being technically waterproof.

If a sensor or other medical equipment is marketed as 'waterproof' it is important to check what is meant by this term. Some manufacturers will mean that the item can withstand the occasional splash of water whilst others may use this term when a product is submersible.

IP67 Explained

IP (Ingress Protection) ratings are international standards that represent the degree to which an object is protected against something getting inside. The first digit relates to entry by a foreign object eg. dust, and the second digit is the protection from water penetration.

Many products now use IP ratings as a benefit including smartphones, headphones and waterproof cases. The higher a number after IP, the better the level of protection.

IP67 means the item has been tested immersed in water under defined conditions of pressure for 30 minutes in depth up to 1m.

An IP68 rating means that an object is suitable for immersion in water under conditions specified by the manufacturer. For sensors rated IP68 you should therefore always check the manufacturer's instructions for appropriate usage of a sensor.

It's also worth noting the tests are carried out in laboratory conditions using pure water when the object is static. It does not necessarily mean that a sensor is suitable for wearing in a swimming pool or the sea.

Sensors such as the FreeStyle Libre or GlucoRx AiDEX have been classified as IP67 and IPX7 (X means untested/not rated).

In the case of Dexcom G6, the manufacturer states the sensor "may be submerged under eight feet of water for up to 24 hours without failure when properly installed."

Most CGM including 'flash', can be worn while bathing, showering or swimming.

NOTE: READERS AND PDM ARE NOT WATER-RESISTANT OR WATERPROOF AND SHOULD BE KEPT AWAY FROM WATER.

Are pumps waterproof?

Some pumps are described by their manufacturer as 'watertight' and this usually means that they can withstand rain and splashes, but are not suitable for submersion.

For example, Tandem pumps are watertight to IPX7 standard but are not suitable for wearing while showering, swimming or diving.

Some Medtronic pumps (MiniMed 630G & 770G) are waterproof with a IPX8 standard, to a limited depth and time and the tubeless Omnipod Dash has an IP68 rating for submersion up to 7.6m for 60 minutes.

Due to general wear and everyday bumps, all pumps can develop tiny cracks which may not be visible but which can make the pump susceptible to water damage. Swimmers should check the pump manufacturer's instructions before exposure to water.

If you're wearing a CGM with a 3rd party transmitter such as MiaoMiao, Blucon NightRider or Bubble, you may find that these are not suitable for immersion in water. As with pumps the plastic can develop cracks which compromise its waterproof rating.

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What could happen if I stay in the water for too long?

Prolonged exposure to water can affect the adhesion of the sensor and its functionality. It may affect the accuracy of readings, temporarily, or in certain conditions, permanently, which may not be immediately obvious.

Sensors do not lie completely flat on the skin and friction from water can cause sensors to become loose or fall off and the longer you are in water the more likely this is to happen.

If swimming in the sea, salt water can affect the adhesion of a sensor (or sticker covering it) causing it to loosen or come off.

Can I make it waterproof?

By conforming to IP67 or IP68 standards, a sensor is already waterproof. Covering it with a sticker, patch or plaster will not make it waterproof or increase the waterproof rating stated by the manufacturer.

Popular ideas to protect sensors are stickers, patches and plasters. However, these are usually water-resistant, not waterproof and not tested for prolonged use.

In some cases, the sensor will still come into contact with droplets of water which could affect the adhesion and they tend to curl and sometimes fray at the edges.

If water becomes 'trapped' under a sensor or a sticker, it can cause bacteria to build up leading to infection and skin irritation.

To maintain a sensor's adhesion to the skin it is important to dry the area around the sensor properly after all water activities.

It is recommended that sensor wearers remove any covering worn in water after use so that the skin is able to dry out and rebalance its pH levels.

How do I protect the sensor when swimming?

We designed our unique Librebands® and Dexbands to give sensors sports style and protection when exercising and swimming.



Wearing a Libreband® or Dexband in water can help protect a sensor from the friction of water and being knocked, alongside many other advantages when compared to stickers and patches.

Advantages of Librebands/Dexbands

- ✓ Quick drying, water-resistant strap
- ✓ Protects against friction of water
- ✓ Soft neoprene fabric for close fit
- ✓ Wear as and when needed
- ✓ Easy to put on and take off
- ✓ Doesn't fray, lift or get dirty at the edges
- ✓ Reduces likelihood of skin irritation
- ✓ Durable for repeated wear with long lasting protection.

Love My Libre customers include triathletes and competitive swimmers.

Our armbands have been worn for prolonged periods in swimming pools, open water, hot tubs, spas and the sea.

Sun cream

Remember, if you are applying sunscreen around a sensor or pump site, be careful not to get this on the adhesive as this could cause it to come unstuck.

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Tips for Swimming

In addition to wearing a Libreband, below are some tips when swimming wearing a sensor.

Planning is the key, as always!

NOTE: IF YOU HAVE A COMPLICATION OF DIABETES, IT'S ALWAYS BEST TO SPEAK TO YOUR DIABETES TEAM BEFORE STARTING A NEW EXERCISE REGIME.

Dealing with MDI

If you inject, you may need to reduce your bolus insulin for the meal you eat prior to your activity. For prolonged activity basal insulin may also need to be reduced in advance.

Using a pump

If you wear an insulin pump, you may need to lower or stop your basal insulin a few hours before the activity.

Preparation

- 1 Check your glucose level before swimming, around half an hour is ideal so that you have time to take action as appropriate. If you have low levels but are not hypo, you may need a snack before you swim.
- 2 Keep hydrated so that the body works as efficiently as possible. Drink water during water activities & afterwards too.
- 3 It's a good idea to make someone aware that you have diabetes when swimming, and wearing medical ID can help in case of emergency.
- 4 Wear flip flops or other suitable footwear around the pool to avoid injuries.

Hypos before swimming

It's best to avoid swimming if you have had a severe hypo in the last 24 hours.

In the water

- 5 Have a hypo treat available at the side of the pool or bathing area, in case of low glucose levels.
- 6 Test your blood sugar during your swim so that you become aware how your body reacts and can better plan for future swims. This is particularly important if you spend a prolonged period in the water.

For prolonged swimming and strenuous activity, it is usually suggested that those with diabetes will need around 15 - 20g of carbohydrate every 30 minutes.

After swimming

- 7 Rinse off after immediately post-swim as this will reduce the effect of any chemicals from the water, or the salt from the sea.
- 8 After swimming, glucose levels may be lower than usual as insulin sensitivity can be increased for up to 24-48 hours. It's best to check glucose levels more during this time.
- 9 Check for any cuts or grazes after you swim that you could have from the side of the pool and make sure they heal properly.
- 10 Always moisturise the skin after being in water to prevent it from drying out.

Spare pumps for holidays

Many pump companies offer a hire or loan scheme for international travel. Contact the pump manufacturer to enquire.

Other water activities

Open water swimming

The key consideration with open water swimming is the temperature of the water. Getting into cold water causes an adrenalin spike and the colder the water, the more energy expended.

Really cold water can increase the likelihood of hypos and these may be trickier to treat when out in open water. In particular, hypo treats will need to be very lightweight, stored somewhere suitable on the body and with little rubbish that needs carrying after consumption.

Before participating in this type of activity it is best to establish a minimum glucose level to start with which allows for levels to drop as energy is exerted.

More carbohydrates may be needed for meals preceding an open water swim, especially if this is one component of a triathlon. Swimmers may need to reduce their basal insulin in advance.

Remember to check the weather forecast as conditions such as air temperature and wind resistance can make the swim 'harder'.

Diving & snorkeling

It is possible to dive with diabetes although PWD will need to declare this to the Dive School or organisation involved, usually at the time of booking. It's likely that you will need to complete documentation with details of your management and a doctor's/healthcare professional's letter.

For those with diabetes, it's important to plan ahead of the dive and try to time the activity so that glucose levels are fairly stable. This may involve changing meal times or the type of food eaten so that levels are not changing rapidly at the time of diving.

None of the CGMs currently on the market (in the UK, and as far as I know worldwide) have been tested for deep sea diving, nor for immersion in salt water.

Swimming Inspiration



Gary Hall Jr, type 1 US Swimming Olympian

US competitive swimmer, Gary Hall, had won two Olympic silver medals before his type 1 diagnosis in 1999.

He was told that he wouldn't swim competitively again but refused to accept this and instead set out to learn all he could about the condition. He then changed his regime to enable him to continue competing including checking his glucose levels every 45 minutes.

At the Sydney Olympics in 2000 he became the first athlete to compete at the Olympics with type 1 diabetes, winning gold. In 2004 he broke his own World Record.

When Hall retired in 2008 he had a total of 10 Olympic medals including 5 Gold.

He is a strong strong advocate for type 1 diabetes and the use of technology to enable better management of the condition, as well as speaking out about the need to address the price of insulin in the US.

However, several bloggers have reported that they have scuba dived and snorkeled wearing a CGM or flash device. They took a reader with them by placing it into a waterproof bag and attaching this to themselves using a suitable cord. They could still get sensor readings by scanning a FreeStyle Libre.

If trying this with a waterproof bag, it is suggested that you perform a 'leak test' prior to diving, to establish if the bag is suitable.

You may also wish to ensure you have a backup plan.

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Pump wearers usually disconnect their pump whilst diving and may use an injection of basal insulin to cover their insulin needs while in the water.

In case of hypos when diving, its best to have suitable snacks nearby when diving and include emergency glycogen or similar. You should also carry all equipment for fingerpricking to check glucose levels as diving can affect a CGM and levels may be erratic when resurfacing after a deep dive.

If diving with a partner (ideally someone who doesn't have diabetes), then it is a good idea to have a safety plan and agree a way to communicate that you need assistance.

Water parks

IP ratings do not relate to the action of water jets on an object and there can be consideration friction involved when descending a water chute or riding the rapids!

High viscosity from water jets may cause the medical tape securing a sensor to the skin ie. underlay, to become unstuck partially or the sensor may fall off completely.

Covering the sensor with an armband or other method can reduce these risks.

Hot tubs, saunas & spas

Being in warm or hot water, may weaken the adhesion of a sensor, not to mention that the movement of water can also affect the sensor's stickiness.

The heat can also affect glucose levels with an increased risk of experiencing a hypo. For safety, it's a good idea to enjoy a sauna or hot tub with a friend, and stay hydrated.

10 Factors that affect skin hydration

Keeping a sensor stuck to the skin can depend on a number of both internal and external factors.

These are some of the reasons that some users may encounter issues with sensor adhesion.

- 1 Insufficient fluid intake
- 2 An unhealthy or unbalanced diet
- 3 Lack of sleep
- 4 Hot showers and baths
- 5 Exposure to sun & UV rays
- 6 Level of fitness / lack of exercise
- 7 Alcohol and smoking
- 8 Air conditioning
- 9 Stress and illness
- 10 Washing too often!

Further information

Swim England:

<https://www.swimming.org/justswim/diabetes-and-swimming/>

Diabetes UK:

<https://www.diabetes.org.uk/guide-to-diabetes/managing-your-diabetes/exercise/swimming-diabetes>

Runsweet Diabetes and sport:

runsweet.com/diabetes-and-sport/swimming/

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LOVE MY LIBRE



Thank you for reading this Libre Life Briefing.

LIBREBAND REVIEWS



Amazing! Fantastic item, 1st time I've been for a swim without losing my sensor.

Maurice, May 2022



The band is brilliant! I've recently started swimming again, and when I use the band, my sensor stays put without me worrying it's going to float away.

Elizabeth, April 2022



What a fantastic little invention! Recently got back into swimming and this has saved my Libre becoming a casualty! Worth the investment thank you"

Hayley, December 2022

Librebands are suitable for sports, exercising, swimming and everyday wear.

A range of Dexbands for Dexcom G6 are available on our website too.

GET MORE FOR YOUR LIBRE LIFE

Join our community of sensor wearers and get further issues of our FREE Libre Life publications.

Subscribe on our website for a 10% discount off your first purchase from our Libreband or Dexband ranges.

Email: hello@lovemylibre.co.uk

Web: lovemylibre.com

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