

**How the Apple watch
could change the daily
life of diabetics**



Source: apple.com

The firm from Cupertino has made further progress towards integrating a blood glucose meter into its Apple watch.

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Diabetes, a worldwide plague

Diabetes is a chronic disease that occurs when the pancreas does not produce enough insulin or the body does not properly use the insulin it produces. This serious disease is a major cause of blindness, kidney failure, heart attacks, strokes lower limb amputations and even death if not treated properly.

Being overweight and sedentary increases the risk of type II diabetes (insulin resistance), which is the most common. It can develop for a long time without symptoms, so prevention therefore plays an important role. Type I diabetes (insufficient insulin production) occurs during childhood. It is much more difficult to detect and often takes parents by surprise.

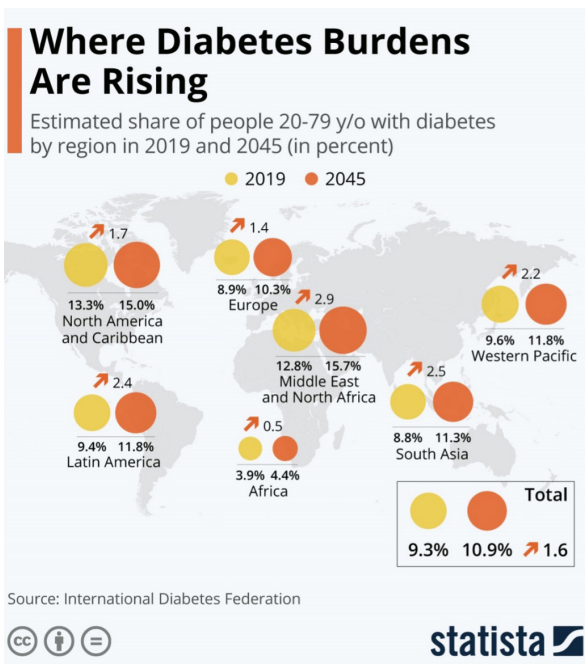
The International Diabetes Federation estimates that 540 million adults are living with diabetes, or 1 in 10 people. This figure is expected to rise to 643 million by 2030 and 783 million by 2045.

More than 3 out of 4 adults with diabetes live in low- and middle-income countries. In Switzerland, it is estimated that nearly 500,000 people have diabetes, of which about 40,000 have type 1 diabetes.

Diabetes was responsible for 6.7 million deaths in 2021, or 1 death every 5 seconds. The disease has resulted in at least \$966 billion in healthcare expenditures, an increase of 316% over the past 15 years.

541 million adults have impaired glucose tolerance, putting them at high risk of contracting type 2 diabetes. In other words, the number of people with diabetes or at high risk of developing it is more than one billion worldwide.

Percentage of people affected by diabetes by region in 2019 (yellow) and estimated for 2045 (orange)



Only people who have diabetes (or who have someone close to them who has diabetes) are aware of the physical and psychological constraints stemming from this disease. People with diabetes must check their blood sugar levels several times a day to prevent them from becoming too low (hypoglycaemia) or too high (hyperglycaemia). To do this, diabetics must prick their finger to obtain a drop of blood to be tested by a small machine (left image). An alternative to this process is the free Freestyle (right image), a sensor to be fixed on the arm or the belly (this operation has to be repeated on average once a week after a small local anesthesia). Diabetics have to inject insulin several times a day via a syringe or via an insulin pump connected to a catheter usually fixed on the buttock or the stomach. These operations and devices are obviously restrictive, invasive and not very aesthetic.



The Apple Watch will host a blood glucose meter for diabetics

The 1st version of the Apple Watch was released in April 2015. To date, over 100 million people are using this connected watch, which in addition to giving the time is permanently synchronized with their iPhone, allowing it to display notifications (calls, SMS, social networks, etc.) in real time.

But the Apple Watch is also equipped with applications that help you monitor your well-being by allowing you to track your medication, protect your hearing from loud sounds or receive reminders to wash your hands.

Apple is betting more than ever on its range of connected watches to improve the health of its users by integrating into the Apple Watch a heart sensor or an accident detector. And according to a new information from Mark Gurman (Bloomberg), the Cupertino firm is getting closer to integrating a non-invasive blood glucose meter to the Apple Watch. This technology is obviously highly anticipated by the diabetic community, who will then be able to read their blood sugar levels from their wrists, without having to undergo any invasive interventions.

Called E5, this project is still at the "proof of concept" stage. The technology is viable but the size needs to be condensed. A prototype as big as an iPhone is being developed. The technology could be integrated into the watch in a few years, once the size of the meter has been reduced sufficiently.

To measure blood sugar without taking blood, Apple is developing a silicon photonic chip that uses optical absorption spectroscopy to send laser light under the skin to determine glucose concentration in the body. In simple terms, these are lasers that will measure glucose concentration under the skin.

Taiwan Semi Conductors (TSMC) developed the main chip to power the prototype. On the Apple side, hundreds of engineers from the Exploratory Design Group (XDG) are working on this project and hundreds of millions of dollars have already been invested to develop this system.

Apple began working on alternative glucose monitoring after purchasing RareLight in 2010 under the leadership of Steve Jobs. For many years, Apple used a startup called Avolante Health LLC to quietly work on the project in a secret facility before transferring it to XDG.

The under-the-skin glucose-sensing technology has been in human trials for 10 years, with Apple using a test group of people with pre-diabetes and type 2 diabetes, as well as people who have not been diagnosed with diabetes.

Apple's regulatory team is in preliminary discussions to obtain government approval for the technology.

Who will the blood glucose meter for the Apple Watch be used for?

With regular blood sugar readings from the Apple Watch in a non-invasive way, diabetics will be able to keep a stable glucose level.

Apple also wants to be able to warn people if they are pre-diabetic, which would allow them to make lifestyle changes before diabetes sets in completely (we are talking about type 2 diabetics here, which differs from type 1 diabetics aka insulin-dependents).

But blood glucose monitoring is not just for diabetics. It is in everyone's interest to minimize blood sugar spikes and dips. Thus, an Apple Watch equipped with a glucose monitor could become the first smartwatch for all health-conscious people. The integration of artificial intelligence could further improve the possibilities for analysis and prevention of diseases and accidents.

Having already disrupted the fields of smartphones, personal computers, music and payments, Apple could soon, thanks to this new technology, establish itself as a key player in the healthcare industry. And change the lives of those who really need it.

For further information

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