Lifecare

Sector: Medtech

A disruptive CGM approach

Redeye initiates coverage of Lifecare, an innovative medtech company offering a next-generation continuous glucose monitor sensor. We see it offering a robust value proposition targeting a multiple billion USD market growing by c15% annually and believe this could represent an ample growth story in the making.

A next generation CGM

Continuous glucose monitoring (CGM) sensors have revolutionised the monitoring of glucose levels for diabetes patients and are considered the gold standard. Lifecare's Sencell product has the potential to be the next generation of CGM devices. It is inserted under the skin and offers a six-month longevity to provide clear quality-of-life improvements for diabetics. In addition to the increased convenience, Sencell also exhibited an accuracy of 9.6% as measured by MARD in the LFS-SEN-001 clinical trial. This level of accuracy aligns with the Dexcom G6 and Freestyle Libre 2, which have been established as industry benchmarks in the recent years.

A clear roadmap towards CE marking and a significant market opportunity

The next crucial step will be to conduct a longevity and biocompatibility study (LFS-SEN-002), which is expected to commence during the second half of 2023. Notably, pharma giant Sanofi has partnered with Lifecare and holds a right of first refusal (ROFR) on Sencell, which we believe adds an exciting dimension to the investment case. Taking into account the current timeline, we anticipate a potential commercial launch of Sencell in 2025. After that, we see potential for Sencell to capture a slice of the CGM market, which is growing at c15% annually and projected to reach >USD13bn in 2026.

Base case at NOK3.5 per share

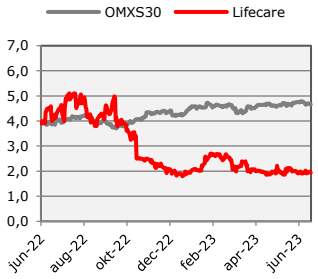
We initiate coverage with a diluted base case of NOK3.5 (83% upside) per share, derived from a 2023e-2033e DCF model, using a 14.5% WACC. In a bull case scenario, we see a value of NOK9 per share, while our bear case amounts to NOK0.5. The wide fair value range indicates the high potential, but also remaining risks in the case. We acknowledge that a valuation upgrade likely will not come overnight and that additional clinical validation and securing a partner are essential to bridge the valuation gap.

Key Financials (NOKm)	2021	2022	2023e	2024e	2025e
Revenues	1,6	22,1	8,3	8,7	72,6
Revenue growth	-70%	1284%	-63%	5%	734%
EBIT	-15,9	-17,3	-45,8	-62,6	-55,0
EBIT Margin (%)	-996%	-78%	-552%	-719%	-76%
EV/Revenue	91,0	7,4	24,4	23,2	2,8
EV/EBIT	neg	neg	neg	neg	neg

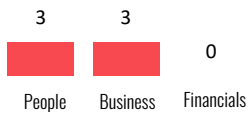
FAIR VALUE RANGE

BEAR	BASE	BULL
0.5	3.5	9

LIFE VERSUS OMXS30 – 12 MONTHS



REDEYE RATING



KEY STATS

Ticker	LIFE
Market	Euronext Growth
Share Price (NOK)	1.9
Market Cap (NOKm)	224
Net Debt (NOKm)	-38
Free Float (%)	64%
Avg. daily volume ('000)	196

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Investment Case

Innovative technology with disruptive potential targeting USD>6bn market

Lifecare targets diabetes patients with its next-generation continuous glucose monitor (CGM), Sencell. We see potential for Sencell – thanks to its robust and differentiated value proposition – to capture a slice of the >USD6bn market, which is growing c15% each year. The sensor's CE marking, anticipated in 2024 following the LFS-SEN-003 trial, should pave the way for a significant commercial opportunity.

Attractive value proposition opening up vast market potential

The blood glucose monitoring market is valued at cUSD11bn and comprises c60% of continuous glucose monitors (CGM), which have grown rapidly since the first approval in 1999. Annual growth is projected at c15% until 2026, suggesting it reaches USD13bn. CGM has revolutionised diabetes monitoring, and we believe Sencell's superior sensor longevity, potentially improved accuracy, and improved convenience should appeal to many patients. Considering the market size, Lifecare's sensor only needs to capture a fraction of the market to generate significant recurring revenue streams and become a very profitable company. The potential of extending Sencell to measure and monitor other analytes and molecules adds additional spice to the long-term case.

Supportive analysis: Appealing market, high value proposition

CGMs have revolutionised diabetes treatment and monitoring by providing patients and physicians with real-time access to glucose levels and trends via a reader, smartphone, or other smart wearables. This stands in contrast to their predecessors, BGMs, which require a blood sample from a finger prick to measure glucose levels at a single point in time. Diabetes management relies on patients injecting insulin based on accurate glucose readings to prevent short- and long-term complications. Improvements to these devices thus have significant implications for insulin-treated diabetes patients, putting a significant emphasis on their accuracy. This accuracy is often measured by the mean absolute relative difference (MARD), which calculates the average absolute difference between CGM readings and reference glucose values over a certain period of time, with lower MARD values indicating higher accuracy.

Sencell, Lifecare's CGM sensor, could offer type 1 diabetics and a subgroup of insulin-treated type 2 diabetics a next-generation approach to blood glucose monitoring. The device, which is the size of a grain of rice, is inserted under the skin and provides real-time glucose monitoring through osmotic pressure for up to six months. In the LFS-SEN-001 clinical trial, Sencell has reported a MARD just above the recently released successors to current market leaders, Freestyle Libre and Dexcom. Such characteristics should be appealing to many patients and allow Sencell to capture a slice of the CGM market, which entails a significant commercial opportunity.

CGM Product	Sencell	Dexcom G7	Eversense E3	Freestyle Libre 3	Medtronic Guadian 4	Competitor Average
Company	Lifecare	Dexcom	Senseonics	Abbott	Medtronic	
MARD (%)	9,6%*	8,2%	8,5%	7,9%	8,7%	8,3%
Sensor logenvity (weeks)	26**	1,5	26	2	1	7,6
Warm-up time (hours)	0,5-1	0,5	24	1	2	6,9
Reading frequency (minutes)	<5	5	5	1	5	4,0
Senzor size (mm)	1x0.5x0.25	24x24x2	16x4x4	19x19x3	19x11x10	20x15x5
Approximate annual cost (USD)	650	4 000	3 300	1 700	4 200	3 300
Placement	Under skin	Arm/abdomen	Under skin	Arm	Arm/abdomen	N/A
Integrable with insulin pump	No	Yes	No	Yes	Yes***	N/A
Calibration required?	No	No	Every 12 hours	No	Every 12 hours	N/A
Requires transmitter to transfer data to phone / wearable	Yes	No	Yes	No	Yes	N/A

* In the LFS-SEN-001 trial, MARD is likely to further decrease ahead of becoming commercially available

**Estimated minimum of 26 weeks

***Only integrable with Medtronic insulin pump

Challenge I: More capital will be required

Promising prospects and market opportunities aside, Lifecare will require additional capital before it turns profitable, which raises the financial risk. In this context, it is comforting that the company has supportive major owners that have participated in previous financing rounds. Our valuation accounts for this risk by including two equity issues, raising a total of cNOK180m, resulting in c50% dilution.

Challenge II: Development and regulatory approval remain

Sencell has generated promising data in a preclinical setting and in initial clinical trials. However, further steps are needed to confirm accuracy, reliability, and safety in a larger clinical setting for Lifecare to obtain regulatory approval for product marketing. Moreover, some minor engineering efforts remain to scale the sensor down to its commercial form.

Valuation

We derive our fair value range based on a 2023e–2032e DCF valuation using a WACC of 14.5% based on our Redeye Rating model and with a risk-free rate of 2.5%.

Our base case amounts to NOK3.5, using relatively conservative assumptions. Moreover, our bull case sees a value of NOK9, assuming a higher market penetration. In our NOK0.5 bear case, we assume Lifecare encounters problems in its clinical trials, delaying market entry, and we assume muted interest among patients.

Base case DCF-assumptions

Base case DCF				
Assumptions		**DCF**	**NOKm**	**Per share**
Tax rate	22,0%	2023e-2025e	-73	-0,3
WACC	14,5%	2026e-2031e	255	1,0
Revenue CAGR, 2023e-2025e	195,8%	Terminal	491	1,9
Revenue CAGR, 2026e-2031e	45,5%	Net cash*	208	0,8
Shares outstanding	117,9			
Shares outstanding (diluted)	253,2			
Terminal values, 2032		**Fair value (diluted)**	**881**	**3,5**
Group revenue (SEKm)	1 778	Upside from current price		83%
Terminal growth	2%			
EBIT margin	20%			
*Including net proceeds from two equity issues				

Source: Redeye Research

Catalysts

LFS-SEN-002 readout

Lifecare's second clinical study evaluating longevity and biocompatibility in up to 50 patients is anticipated to read out in Q4 2023.

Anticipated impact: Moderate

Time horizon: Six months

LFS-SEN-003 readout

The LFS-SEN-003 study aims to ensure technical documentation adhering to the European Medical Device Regulations to obtain a CE mark for Sencell.

Anticipated impact: Major

Time horizon: 18 months

Partnership with a commercial player

To fully launch Sencell, Lifecare will need a commercial partner, likely a more prominent player in the diabetes field. Signing such a deal would likely boost the share price. Sanofi has a right of first refusal for Sencell.

Anticipated impact: Major

Time horizon: 18–24 months

Counter-thesis

Development risk

Lifecare has no regulatory approval: product development continues until Sencell has a CE mark. Accordingly, this could lead to delays and higher development costs than anticipated.

Regulatory risk

The development of medical devices like Sencell emphasises safety, which means regulatory authorities thoroughly review products before awarding regulatory approvals.

Financing risk

Lifecare is a pre-revenue company with an as yet unproven business model. Accordingly, it will require more capital, and investors should consider future dilution.

Fierce competition

The CGM market is indeed noted for the fierce competition among medical technology giants such as Abbott Laboratories, Medtronic, and Dexcom. Moreover, recent rumours and patent filings suggest Apple is working on a potentially ground-breaking non-invasive technology for blood glucose monitoring. This would have the potential to disrupt the market. It is important to note, however, that the development and commercialisation of such a technology is likely several years away, if it ever materialises.

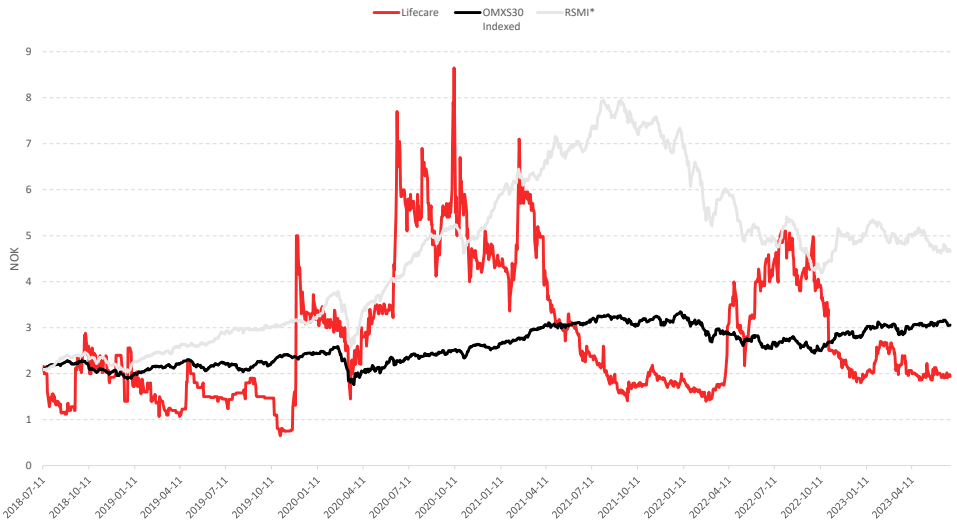
Share price development

Since its IPO in the middle of 2018, Lifecare's shares have traded with high volatility, with individual press releases having had a significant impact. The share reached an all-time high at NOK7.1 in February 2021 after news regarding Sencell and COVID-19 testing efforts. Since then, the share price has declined, and it currently trades at NOK1.9. We highlight the following factors as primary contributors to this decline:

- Delay in the Sencell development timeline following the COVID-19 pandemic
- Saturation of the market for COVID-19 testing, which initially prompted a spike in Lifecare shares following the development of its COVID-19 antigen test
- Acquisition of growth capital through equity issuance – first in October 2021 and again in October 2022
- A weaker macroeconomic climate in which investors favour value stocks over growth stories, particularly in the development phase, as Lifecare is

Ongoing development and progress taking Sencell closer to the market is likely to be the primary factor in a positive share price trajectory in the future.

Share price development since IPO



**Redeye Swedish Medtech Index (RSMI) – Equally weighted with ~100 constituents listed on Swedish exchanges*

Source: Redeye Research, Millistream

Company description

Background

Established in 2006, Lifecare AS is a Norwegian clinical-stage medical sensor company with subsidiaries in Mainz (Germany), Reutlingen (Germany), and Bath (UK). Its primary focus is on developing the next generation of continuous glucose monitoring (CGM) systems based on osmotic pressure. In the future, this could also be suitable for identifying and monitoring other analytes and molecules in the human body.

Lifecare AS organises its operational development initiatives through subsidiaries and research collaborations with the University of Bath (UK) and the Goethe University of Frankfurt (Germany).

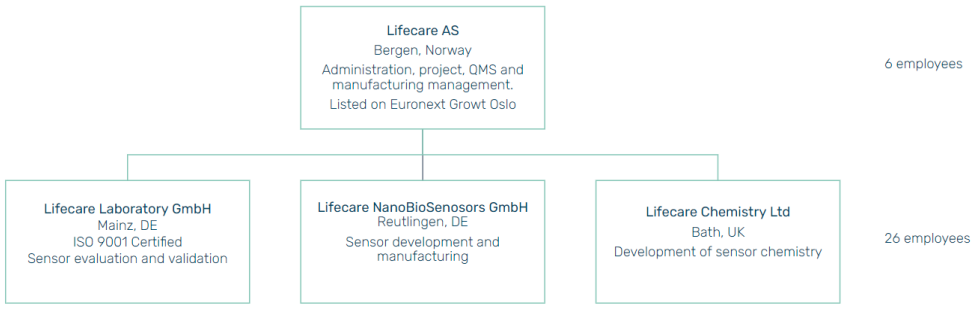
Lifecare NanoBioSensors GmbH in Reutlingen, Germany, develops and manufactures Lifecare's sensors and sensor systems, utilising the licensed Nano3DSense production method to print nanoscale pressure-sensor elements onto micro-sensors. This technique has enabled the miniaturisation of sensors suitable for subcutaneous implantation in humans.

In August 2021, Lifecare AS acquired Lifecare Laboratory GmbH, which is responsible for sensor and chemistry validation, processing in-vitro and in-vivo test results, and offering clinical research and testing services for the pharmaceutical and biotechnical industries. The laboratory also provides sensor validation and evaluation services to external customers and operates as a Covid PCR and rapid test centre under the German Infectious Disease Defence Act.

Lifecare Chemistry Ltd was incorporated in November 2022. The entity is a spin-off from Lifecare's long-standing research collaboration with Professor Tony James and his research team at the University of Bath. Lifecare Chemistry Ltd has been established to enhance the existing research partnership further and ensure Lifecare's ownership of the scientific, strategic, and operational advancements related to its enhanced analyte-specific chemical receptors.

At the end of May 2023, Lifecare announced a new company called Lifecare Veterinary, targeting veterinary use with its sensor. Bergen-based veterinary and entrepreneur Jo Amundstad will be the general manager of the subsidiary.

Organisational overview



Source: Company presentation

Historical highlights

Lifecare	
2018	
	Listed on Oslo Stock Exchange
	Identification of method for miniaturising pressure sensor enabling substanzial device miniaturisation
	Service agreemnet with cantiMED UG, patentholder of nano-production method
2019	
	In-vitro experiments confirming functionality of miniaturised pressure sensor
	Announcement of preparations for clinical testing
2020	
	Filing of Clinical Study Protocol
	Lifecare recieves grant from EU Commission as part of consortium FORGETDIABETES working to develop an artificial pancreas
2021	
	Lifecare recieves regulatory approval for first-in-human Clinical Pilot Evaluation
	Lifecare aquires cantiMED UG (renamed Lifecare NanoBioSensors GmbH)
	New patent granted
	Term sheet for acquisition of the laboratory of Pfützner Science & Health Institute GmbH (later renamed to Lifecare Laboratory GmbH
2022	
	Acquisition of Pfützner Science & Health Institute fomalized and finalized
	Successful in-vitro testing confirms functionality of miniaturised sensors with nanoscale pressure sensors, which confirms prototypes for upcoming clinical trials
	Start of clinical development studies, first-in-human
	Lifecare innovations categorised among top 14% of innovations recieving funding from EU Commission.
	Letter of intent - production location in Mainz
	Interim data analysis: proof-of-concept in humans
2023	
	Successful ISO audit - Lifecare Laboratory GmbH
	Sensor longevity: 12 weeks in-vitro
	Lifecare signs lease agreement in Mainz
	Lifecare launches spin-off company "Lifecare Veterinary"

Source: Company presentation

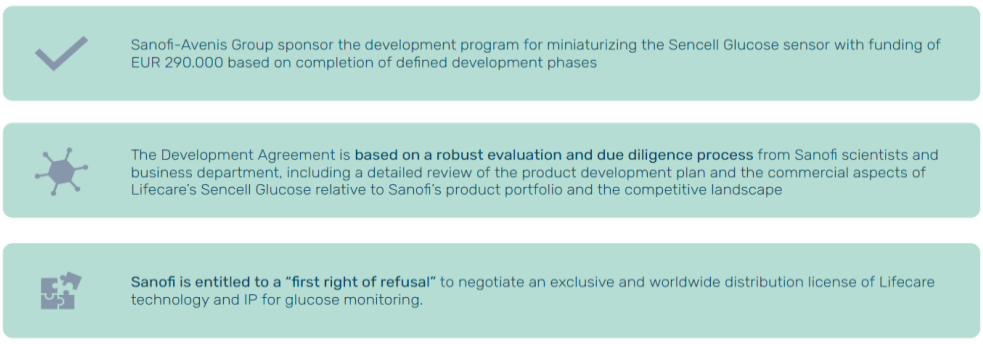
Business strategy

Diabetes patients are required to monitor their blood glucose levels continuously, resulting in a consistent demand for glucose sensors that need to be regularly replaced, this creates predictable revenue streams for the established players. Moreover, there is robust demand from both physicians and patients for a continuous glucose monitoring (CGM) system, since these are more convenient, with less discomfort, an ability to significantly improve glycaemic control, mitigation of diabetes-related complications, and an enhanced overall quality of life.

Lifecare is committed to developing its Sencell sensor technology and establishing its own production line to meet these demands. The company has taken significant steps towards this goal, including signing a lease agreement and initiating the production of a large-volume facility in Mainz, Germany. However, Lifecare also recognises the importance of partnering with a larger, established player to commercialise the product effectively and ensure compatibility with the aforementioned devices.

In line with this strategy, Lifecare has entered into an agreement with Sanofi, granting the pharmaceutical giant a right of first refusal (ROFR) for the technology. This partnership demonstrates Lifecare's intention to collaborate with industry leaders to advance the technology and take it to market.

Product development agreement with Sanofi



Source: Company presentation

Value proposition

Sencell's value proposition is built upon several key factors, aiming to deliver competitive accuracy, durability, and user comfort while addressing patients' needs and preferences. These factors include:

- **Potentially improved accuracy:** According to the preclinical and clinical trials conducted by Lifecare, Sencell's accuracy is superior to that achieved by the current market-leading sensors at the corresponding stage of development, and it is even comparable to the current industry benchmarks. With ongoing algorithm improvements, it is likely that Sencell's Mean Absolute Relative Difference (MARD) will be even lower, potentially surpassing today's industry benchmarks. However, confirming this claim requires further large-scale studies and additional algorithm enhancements.

- **Extended sensor longevity:** Sencell boasts an impressive six-month lifespan (and potentially even longer), significantly outperforming existing market leaders whose sensors typically offer a lifespan of only 10–14 days, implying additional convenience for patients with Sencell.

- **Superior patient comfort:** Sencell's design prioritises patient comfort by embedding the sensor beneath the skin. This approach mitigates the risk of accidental detachment due to physical impact, providing a more secure and reliable monitoring experience. Additionally, patients will likely appreciate the aesthetic aspect of not having a visible sensor attached to their bodies, further enhancing their comfort.

- **Calibration-free technology:** Sencell is a calibration-free sensor system. This innovative feature eliminates the need for regular calibration procedures, simplifying the monitoring process for both patients.

By combining competitive accuracy, extended sensor longevity, superior patient comfort, and calibration-free technology, Sencell has the potential to capture a slice of the >USD6bn CGM market.

Competitive advantages

Lifecare's approach to revolutionising minimally invasive CGM by measuring glucose levels through osmotic pressure is novel, and no competitor is pursuing this approach. Sencell allows for a significant step-up in longevity versus the market-leading sensor, which needs replacing every two weeks. We also emphasise that Sencell's positioning under the skin is a clear competitive advantage due to its value proposition to patients.

In terms of IP, Lifecare has patents covering the membrane (until 2024), extended osmotic pressure (until 2030), and the measurement with a sensor based on two chambers with a pressure sensor (until 2038), with additional patent applications pending.

Management, board and owners

Lifecare has ~25 employees, and its management and board of directors provide the company with experience in relevant areas, including R&D, finance, law, and management.

CEO Joacim Holter holds an LLM from the University of Bergen in Norway. He has spent more than 15 years in various management roles, including six years leading international R&D and product development in Switzerland. He also has been with the company for a long time, serving as both chairman and board member in 2011–2020.

The board of directors is led by Morten Foros Krohnstad, a partner in the law firm Schjødt, and he brings extensive experience as a board professional in Norwegian listed and unlisted companies.

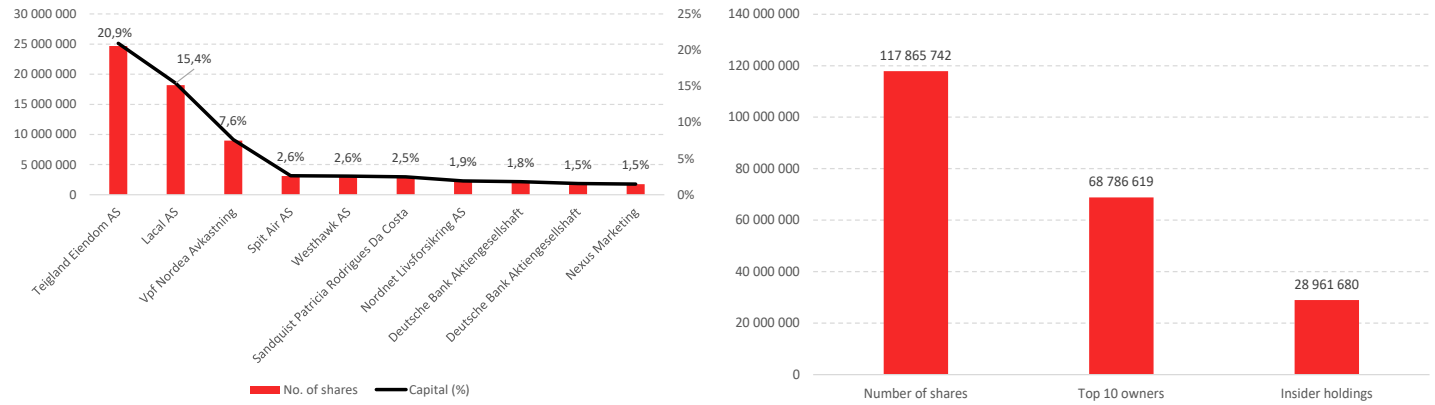
A more detailed description of management and the board can be found in the Appendices.

Insiders hold about 29.2m shares in Lifecare, accounting for c25% of the equity:

- c24.7m shares – Teigland Eiendom AS (Trine Teigland, board member)
- c2.6m shares – Islay Venture AS (Andreas Pfützner, CSO)
- c1.9m shares – Cimter AS (Joacim Holter, CEO) and Joacim Holter (private)
- 0.2m shares – Hanibal Invest AS (Hans Hekland, board member).

We consider this a relatively high proportion and view it positively, since it signals alignment with shareholder value in management decision-making. It is also positively reflected in our Redeye Rating Model, in which skin in the game is an essential parameter.

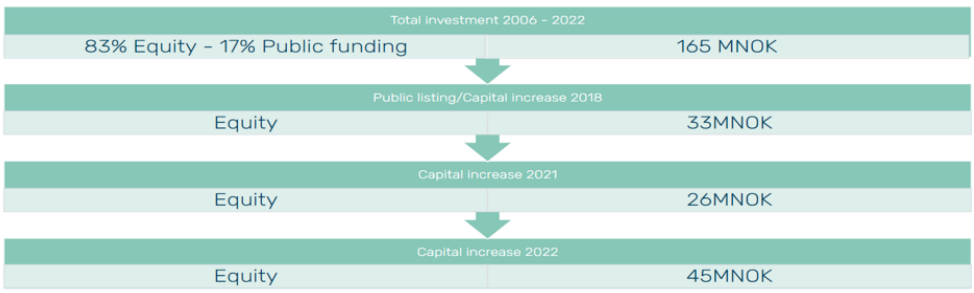
Shareholders structure and share distribution



Source: Modular finance

Lifecare was listed in 2018, raising NOK33m, and its shares trade on Euronext Growth Oslo in Norway. Since 2006, the company has raised a total of NOK165m, raising equity twice since its IPO –cNOK45m in an accelerated book-building process in October 2022 at a price per share of NOK2.5 and cNOK26m in October 2021. We note the largest shareholders, Teigland Eiendom and Lacal, participated in both, as insiders in the form of Hanibal Invest and Hereid Invest, while a few more among the 10 largest shareholders also participated, which we deem encouraging.

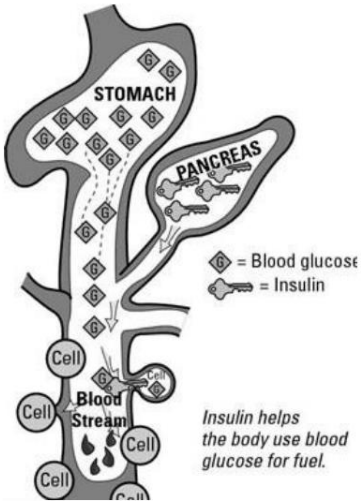
Financing history



Source: Company presentation

Diabetes

Aetiology and disease overview

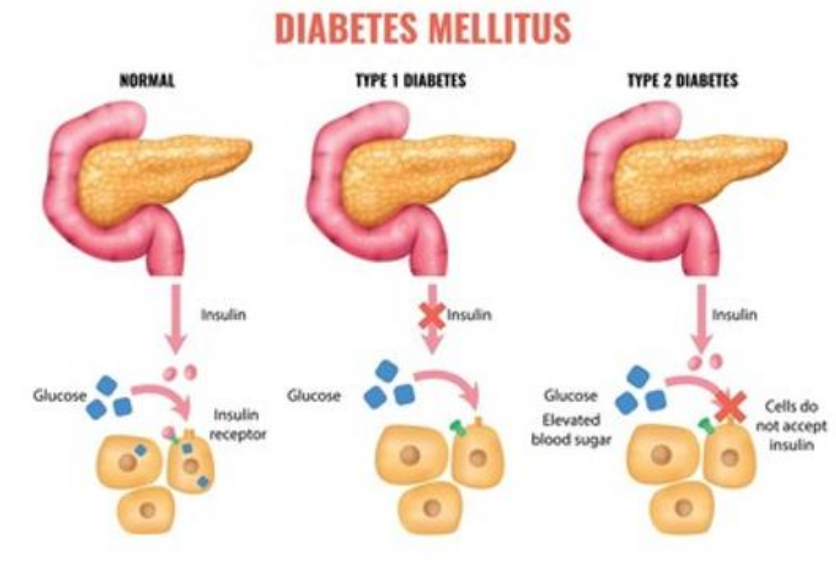


During digestion, the human body breaks down carbohydrates from foods like bread, rice, and pasta into various sugar molecules. One of these molecules is glucose, the body's primary energy source. Glucose is absorbed directly into the bloodstream after eating. With the help of the hormone insulin, glucose can enter the cells of the body's tissues. A simplification is that insulin acts as a key that opens the door (cells) to allow blood glucose to enter, as shown in the diagram to the right.

Diabetes mellitus refers to a group of metabolic disorders characterised by hyperglycaemia (elevated blood glucose levels) owing to insufficient insulin secretion or insulin sensitivity in the cells. The two main types of diabetes mellitus are type 1 diabetes (T1D) and type 2 diabetes (T2D), with the latter being by far the most common, estimated at 87–91% of all diabetes cases in high-income countries[1]. There is also a third form called gestational diabetes, which occurs during pregnancy and may disappear after delivery. Roughly half of the women with gestational diabetes develop type 2 diabetes at some point in their lives.

The World Health Organization estimates 8.5% of adults aged 18 years or older had diabetes in 2014, of which the majority had T2D. It also states that in 2019 diabetes was the direct cause of 1.5 million deaths, while 48% of all deaths due to diabetes occurred before sufferers reached 70 years of age.

Diabetes mellitus



Source: British Society for Immunology

[1] Xu G, Liu B, Sun Y, Du Y, Snetselaar LG, Hu FB, Bao W. Prevalence of diagnosed type 1 and type 2 diabetes among US adults in 2016 and 2017: population-based study. BMJ. 2018 Sep

Type 1 diabetes mellitus

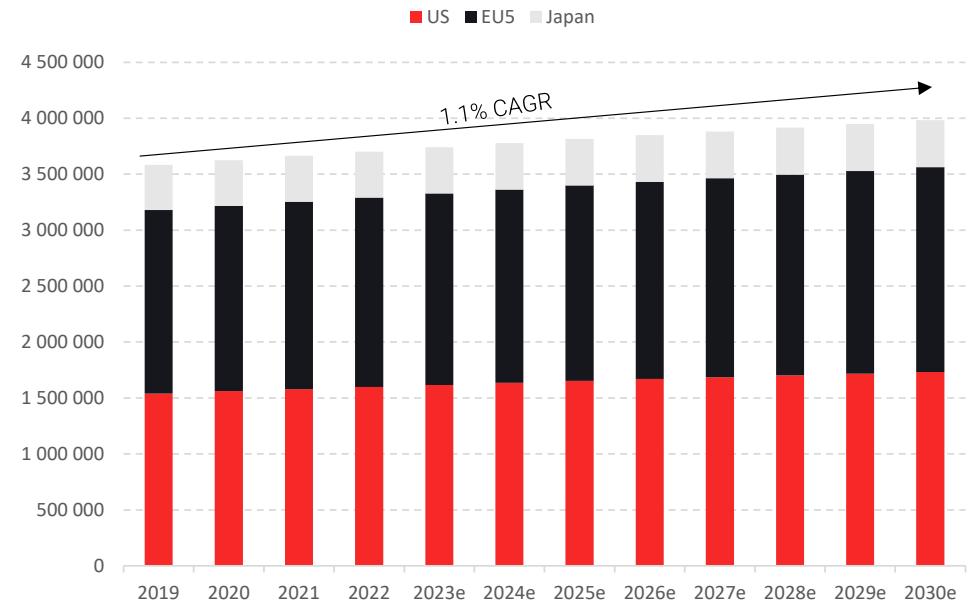
Type 1 diabetes is a chronic autoimmune disorder that affects approximately less than 10% of diabetics. It is characterised by the destruction of insulin-producing beta cells in the pancreas, leading to an absolute insulin deficiency. T1D was previously known as insulin-dependent, juvenile, or childhood-onset diabetes, but it can occur at any age. The exact cause of T1D is not fully understood, but it is thought to be a combination of genetic and environmental factors that trigger an autoimmune response. The immune system attacks and destroys beta cells in the pancreas, which are responsible for producing insulin, a hormone that regulates blood sugar levels.

As a result, individuals with T1D require a complex dosing regimen of self-administered daily insulin injections or an insulin pump to manage their blood sugar levels. Symptoms of T1D can include excessive thirst, frequent urination, fatigue, weight loss, and blurred vision. If untreated, T1D can lead to severe complications, including heart disease, kidney damage, nerve damage, and vision loss.

Diagnosis of T1D is usually based on clinical symptoms, blood tests to measure blood glucose levels, autoantibodies, and a glucose tolerance test. Treatment of T1D involves a lifelong commitment to monitoring blood sugar levels, taking insulin as prescribed, following a healthy diet and regular exercise, and attending routine medical appointments to manage the disease and to prevent complications.

T1D typically appears at two noticeable peaks: at 4–7 years of age and at 10–14 years of age, although it can occur at any age. Prevalence in the seven major markets is forecast to grow from c3.7million in 2022 to c4million in 2030.

T1D prevalence in the seven major markets



Source: Datamonitor (data), Redeye Research (calculations)

Type 2 diabetes mellitus

Type 2 diabetes, formerly known as non-insulin-dependent or adult-onset diabetes, affects about 90% of individuals with diabetes. Various factors, such as age, race, gender, genetics, diet, body weight, and exercise levels, influence its onset. The disease starts as insulin resistance, with the body producing insulin but not utilising it efficiently, eventually progressing

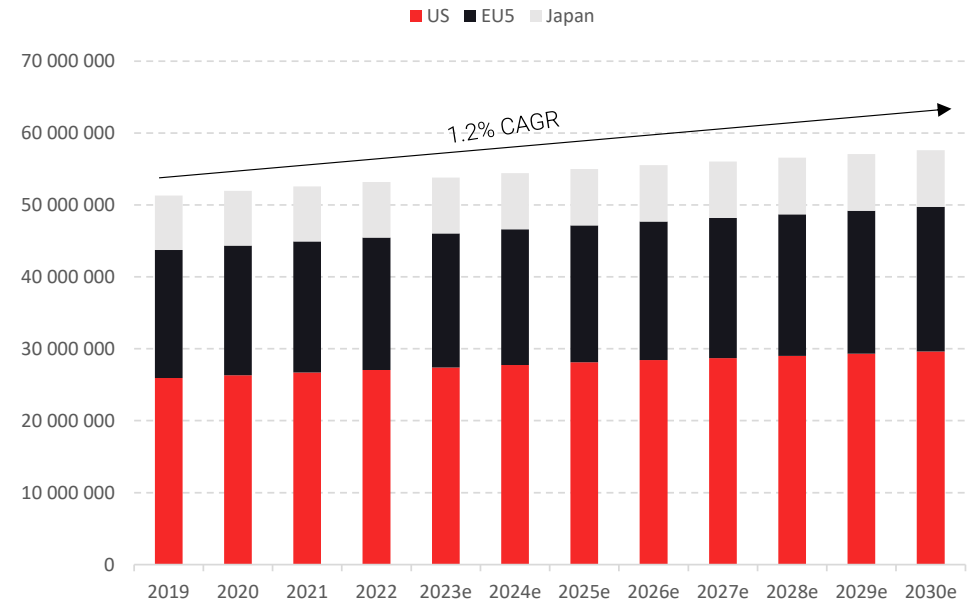
to the point where the pancreas stops producing insulin altogether. In the early stages of the disease, non-insulin antidiabetic medications are typically effective in controlling blood glucose levels. However, supplemental insulin is usually necessary as the pancreatic beta cells become exhausted. Although the symptoms of T2D may resemble those of T1D, they are often milder, making it challenging to diagnose. According to the World Health Organization, T2D, previously diagnosed only in adults, is increasingly being detected in children.

Gestational diabetes, which develops during pregnancy, is characterised by hyperglycaemia, with blood glucose levels above normal but lower than those seen in chronic diabetes. Prenatal screening typically detects gestational diabetes, which places women at a higher risk of pregnancy and delivery complications and their children at a higher risk of developing T2D.

The pathophysiology of T2D is not entirely clear. It is known that the profile of insulin secretion in response to glucose is altered. Patients typically have insulin resistance due to obesity, physical inactivity, and beta-cell dysfunction signs even before developing T2D. As insulin resistance worsens, the pre-diabetic pancreas increases total insulin production to compensate, but diabetes develops when it can no longer do so and insulin secretion falters. It is unclear to what extent the enhanced beta cell activity itself may contribute to the dysfunction and eventual destruction of beta cells. Additionally, it is unclear to what extent genetic versus environmental factors play a role in T2D.

In summary, the main difference between T1D and T2D is that the pancreatic islets do not produce any insulin in T1D, leading to high blood glucose levels. By contrast, with T2D, insufficient insulin is released from the pancreas, and/or the cells become increasingly resistant to the insulin produced. Therefore, oral T2D therapeutics typically aim to increase insulin secretion and/or reduce the patient's resistance to the insulin produced.

T2D prevalence in the seven major markets



Source: Datamonitor (data), Redeye Research (calculations)

Hyper- and hypoglycaemia

Hyperglycaemia and hypoglycaemia are two conditions involving abnormal glucose (sugar) levels in the blood, affecting both T1D and T2D.

Hyperglycaemia is defined as high blood glucose levels, typically above 180 mg/dL (10 mmol/L) for a prolonged period. This is commonly seen in individuals with diabetes who do not have adequate insulin production or function, or who are not taking their insulin or other glucose-lowering medications as prescribed. Hyperglycaemia can cause various symptoms, such as increased thirst, frequent urination, blurred vision, fatigue, and headaches. Over time, it can lead to severe complications like nerve damage, kidney damage, and cardiovascular disease.

Hypoglycaemia, on the other hand, is defined as low blood glucose levels, typically below 70 mg/dL (3.9 mmol/L). It can be caused by excessive insulin or glucose-lowering medication, skipping or delaying meals, or engaging in vigorous exercise without adequate carbohydrate intake. Symptoms of hypoglycaemia can vary but may include sweating, trembling, confusion, dizziness, and even loss of consciousness. Severe or prolonged hypoglycaemia can be life-threatening if not treated promptly. Both hyperglycaemia and hypoglycaemia can be managed by regularly monitoring blood glucose levels, lifestyle modifications (such as healthy diet and exercise), and medication adjustments. Individuals with diabetes must work closely with their healthcare provider to establish individualised blood glucose targets and management plans to prevent the complications associated with hyper- or hypoglycaemia.

Tight glucose control is essential to avoiding long-term complications

To avoid the long-term adverse effects and discomfort people with diabetes experience during hypoglycaemia and hyperglycaemia, tight glucose control is crucial. Diabetes symptoms may be alleviated through timely and appropriate treatment, either via conventional glucose control (≤180mg/dL) or tight glucose control (80–110mg/dL)[2]. Maintaining tight glucose control is essential for preventing short and long-term complications in diabetes patients. The Diabetes Control and Complications Trial (DCCT) conducted between 1983 and 1993 and funded by the NIDDK involved more 1,400 T1D patients aged 13–39 years. It showed that maintaining tight glucose control delayed the onset and progression of various diabetes complications, including eye, kidney, and nerve diseases. The study demonstrated a 76% reduction in the risk of developing eye disease, a 50% reduction in the risk of kidney disease, and a 60% reduction in the risk of nerve disease (NIH, 2020).

The ongoing follow-up Epidemiology of Diabetes Interventions and Complications (EDIC) trial, which enrolled 96% of the DCCT participants, has demonstrated that maintaining tight glucose control lowers the risk of advanced diabetic eye disease by 49%, eye surgery by 49%, advanced kidney disease by 33%, nerve problems by 30%, and cardiovascular diseases (including heart attack and stroke) by 30% (NIH, 2020).

A 2016 survey by Abbott Laboratories that analysed the responses of 1,527 people with type 2 diabetes found that 40% of respondents did not test glucose levels as often as recommended by physicians. Reasons for this included:

- Expense of testing strips (31%)
- Aversion to pricking fingers for blood testing (29%)
- Forgetting to test because they felt fine (26%).

[2] Wang L, Li X, Wang Z, et al. Trends in Prevalence of Diabetes and Control of Risk Factors in Diabetes Among US Adults, 1999-2018.

Accordingly, one key challenge to effective treatment is patient compliance and consistency, as reduced compliance is likely to increase the likelihood of complications and reduce the effectiveness of treatment. Both insulin pumps and continuous glucose monitors (CGMs) are highlighted as supportive tools to do this and reduce risks by eliminating human error and non-compliance.

Treatment and monitoring

Diabetes diagnosis involves repeated blood glucose testing after the emergence of typical symptoms. Tests include HbA1C (also called A1C), which is a long-term, fasting blood glucose and glucose tolerance. Treatment for diabetes includes insulin, oral medications, dietary changes, and physical activity changes to control blood glucose levels. T1D requires daily insulin treatment, while T2D can be treated with oral medication or insulin in severe cases.

Blood glucose monitoring involves taking a blood sample from the patient. This can be done using test strip-based glucose meters (BGM) or continuous glucose monitoring (CGM) devices. Test strip-based meters only measure glucose levels at a single point in time, while CGMs provide trend data and allow for semi-autonomous dosage administration based on real-time data. Initially, CGM devices might require calibration using traditional blood glucose measurements.

BGM (left), CGM (right)

Source: Healthline (pictures)

In practice, this translates to diabetes patients being required to monitor their blood glucose levels 24/7 with a high variance of individual preference of the frequency of blood glucose readings, ranging from one per day up to several times a day. Generally speaking, T1Ds and insulin-treated T2Ds must test their blood glucose more often, partly due to the risk of hypoglycaemia after insulin injections.

Physicians monitor the patient's HbA1c, a biomarker that provides information about the patient's average blood glucose over the previous 2–3 months. HbA1c refers to glycated haemoglobin, which develops when haemoglobin, a protein within red blood cells that carries oxygen through the body, joins with glucose in the blood and becomes "glycated". The more glucose in the blood, the more haemoglobin will bind to glucose. The turnover of red blood cells is up to three months. HbA1c is measured from a drop of blood from the patient.

CGMs provide patients and physicians with the ability to monitor the amount of time patients spend within a pre-defined target range for appropriate glucose levels, measured as a percentage. This clinically monitored factor generates valuable data for physicians, which was previously unavailable with traditional BGM's, making it a valuable addition to the HbA1c metric and contributing to the reduction of long-term complications for patients.

The American Diabetes Association (ADA) reports that approximately six million people in the US use insulin for diabetes treatment, with subcutaneous delivery via syringe, insulin pen, or insulin pump being the standard method. Insulin pumps – which contain a control unit, insulin reservoir, and infusion unit – have, like CGMs, grown in popularity as their design mitigates compliance and human error issues, eventually leading to better glucose control.

According to the American Diabetes Association (ADA), the American Association of Clinical Endocrinology (AACE), and the National Institute for Health and Care Excellence (NICE) the following are the recommended steps following treatment initiation for T1D:

Recommended treatment for T1D patients

Step	ADA
Lifestyle management	• Patients should be educated on how to match mealtime insulin doses to carbohydrate intake, fat and protein content, pre-meal glucose, and anticipated physical activity
Overall insulin regimen	• Most people with T1DM should be treated with multiple daily injections (MDI) of prandial (mealtime) and basal insulin, or continuous subcutaneous insulin infusion (insulin pump)
Basal insulin	• The guidelines note that the longer-acting insulins Toujeo and Tresiba may lower hypoglycemia risk compared to insulin glargine • NPH is a less preferred alternative
Mealtime insulin	• Most patients with T1DM should use RAA to reduce hypoglycemia risk • The guidelines note that Fiasp and Lyumjev may reduce prandial excursions better than RAA, and that inhaled insulin may cause less hypoglycemia and weight gain than RAA • Regular human insulin is a less preferred alternative
Mixed insulin	• While use of mixed insulin requires fewer injections for people with a strong preference for this and can lower cost, it is a less preferred alternative, with less flexibility and higher risk of hypoglycemia than others
Insulin pumps/CGM	• While most studies comparing pumps and MDI have been small and short in duration, a systemic review and meta-analysis concluded that pumps have modest advantages on lowering A1C (-0.3%) and for reducing severe hypoglycemia. However, there is no consensus on guiding the choice for a given individual. Still, the guidelines say that intensive insulin management using an insulin pump and CGM should be considered in most • Evidence for an advantage of closed-loop systems over sensor-augmented pumps, and closed-loop systems may be considered in patients capable of using them safely • CGM is standard of care for most with T1DM
Insulin-naïve type 1 diabetes patients	• No mention of use of specific insulins for insulin-naïve patients
Non-insulin treatment	• Pramlintide is approved for use in T1DM, with evidence for a modest reduction in A1C and weight • Results have been reported for metformin, GLP inhibitors (eg liraglutide), and SGLT-2 inhibitors as non-insulin treatments for T1DM; however, they are currently only approved for T2DM, and SGLT-2 inhibitors are associated with an increased risk of diabetic ketoacidosis. Risk and benefits continue to be evaluated
Surgical treatment	• Pancreas and islet transplantation can normalize glucose, but given the need for lifelong immunosuppression, should be reserved for patients undergoing simultaneous renal transplantation or for those with recurrent ketoacidosis or severe hypoglycemia despite intensive glycemic management

ADA = American Diabetes Association; CGM = continuous glucose monitoring; GLP = glucagon-like peptide; RAA = rapid-acting analogs

Source: Datamonitor, American Diabetes Association

Continuous glucose monitoring – a game changer

As mentioned above, blood glucose monitoring is crucial for individuals with diabetes to reduce the risk of complications, especially those with T1D and those with T2D who use insulin or experience symptomatic blood sugar fluctuations. Primarily, patients use two types of blood glucose monitoring devices: traditional handheld blood glucose meters (BGMs) used at home or by healthcare practitioners, and wearable sensor-based continuous glucose monitors (CGMs), primarily used by type 1 and insulin-dependent type 2 diabetics.

The market for blood glucose monitoring devices is highly competitive, with numerous brands, models, and design philosophies. Most producers focus on traditional BGMs for which the technology is relatively simple and has seen minimal changes over the past 40 years beyond miniaturisation, improved testing, and accuracy. Competition in the traditional BGMs segment focuses on accuracy and cost rather than additional features.

By contrast, the CGMs market is smaller in the number of patients but financially more significant than its BGM counterpart. The overall complexity of CGMs, particularly when paired with third-party systems like insulin pumps, makes them more expensive to produce. Moreover, because CGMs are a novel technology, regulatory bodies require producers to demonstrate that their products are as effective as BGM devices.

A CGM monitor is a disposable device that measures blood glucose levels and transmits the data to an external device, such as a mobile phone, automated insulin pump, or dedicated

control unit. Unlike traditional handheld BGMs, CGMs do not have a display system and instead rely on paired devices to convey information to patients and healthcare providers. CGM systems continuously measure glucose levels every few minutes and transmit data in real-time, enabling insulin pumps to make dosing adjustments based on this. Patients not using insulin pumps can also benefit from CGMs, as they only need to attach the device once and leave it in place for several days, avoiding multiple finger pricks.

The first CGM, from MiniMed, was approved in 1999. It proved functional for three days and needed to be calibrated several times each day for acceptable accuracy. However, much has happened in the field since, and guidelines published by the American Association of Clinical Endocrinologists and American College of Endocrinology recommend that patients with T1D, T2D patients dependent on insulin injections, and those at risk of hypoglycaemia should use a CGM[3]. There are a handful of approved CGM brands on the market, the most prevalent being Freestyle Libre, Dexcom, Medtronic, and Eversense.

Examples of CGM's and dedicated control units

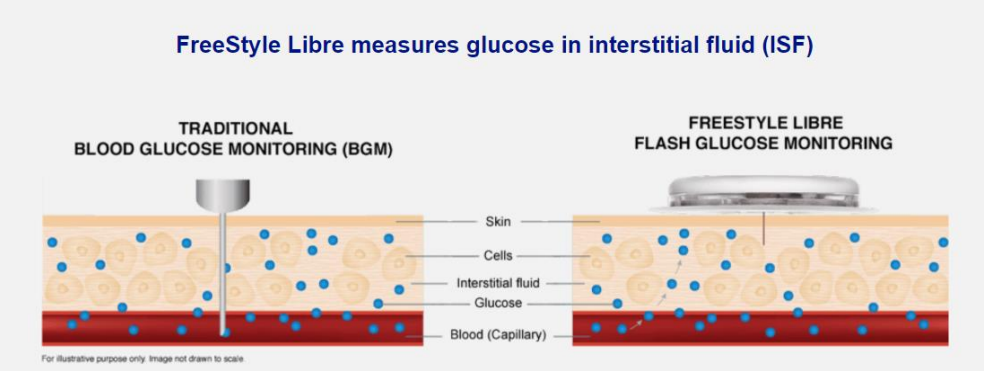
Source: Nature

CGMs differ from BGMs in that they measure glucose concentration in the interstitial fluid (ISF) through a needle that remains in the skin, held in place with a waterproof adhesive. To mitigate discomfort and the risk of infection, it is suggested that the device be attached to areas with more adipose tissue, such as the abdomen or upper arm, and sterilisation of the target area before device application is crucial.

Another distinction between traditional BGMs and CGMs is that CGMs utilise needle sensors that penetrate the subcutaneous adipose tissue to access ISF for glucose monitoring, rather than via a finger prick to gather a blood sample. Moreover, it is important to recognise that glucose levels are measured in two compartments, ISF and plasma, and CGMs track changes in ISF rather than blood. Equilibration between plasma and ISF glucose is not immediate, resulting in different dynamic patterns of plasma glucose concentrations during rapid changes. Consequently, unlike blood glucose meters, which measure glucose levels in the finger, CGM readings from the ISF are slightly delayed (c10–15 minutes) compared to actual glucose levels, which can cause some inconvenience for patients.

[3] (AACE, 2015)

Differences between CGM (Freestyle Libre 3) and BGM



Source: Abbott Laboratories

On the whole, we highlight the following factors as the driving factors in the competition for CGMs:

- **Accuracy often measured by mean absolute relative difference (MARD)**
- **Patient convenience and quality of life (QoL)**
- **Insulin pump integration**

In this context, we emphasise that personal preference plays a significant role, as these medical devices can be a crucial part of life for their users, their decisions for appropriate medication being based on the data generated from the CGM. This means some patients put extra emphasis on QoL aspects, such as size, while others find integration with the insulin pump of choice more important. And this can be of no significance whatsoever to a diabetic administering insulin through injections rather than an insulin pump.

Accuracy often measured by mean absolute relative difference (MARD)

Most CGMs' performance, or accuracy, is characterised by the mean absolute relative difference (MARD). The MARD is frequently employed to compare the accuracy levels among various CGMs. This metric is also applicable to the traditional BGMs, which report levels of 5–10%[4].

In the early days, this was a significant barrier for CGMs to overcome, as the initial sensor iterations had a MARD in the 13–15% range with a sensor longevity of only 3–5 days. This limited these devices to general glucose tracking and trend analysis, making them unsuitable for making medical decisions based solely on the sensor's readings. To do that necessitated using a blood glucose meter (BGM) to supplement the information. A CGM must exhibit a MARD of less than 10% to be considered clinically relevant. However, it is important to emphasise that the MARD is not the sole aspect considered by patients or physicians, as discussed earlier in this section.

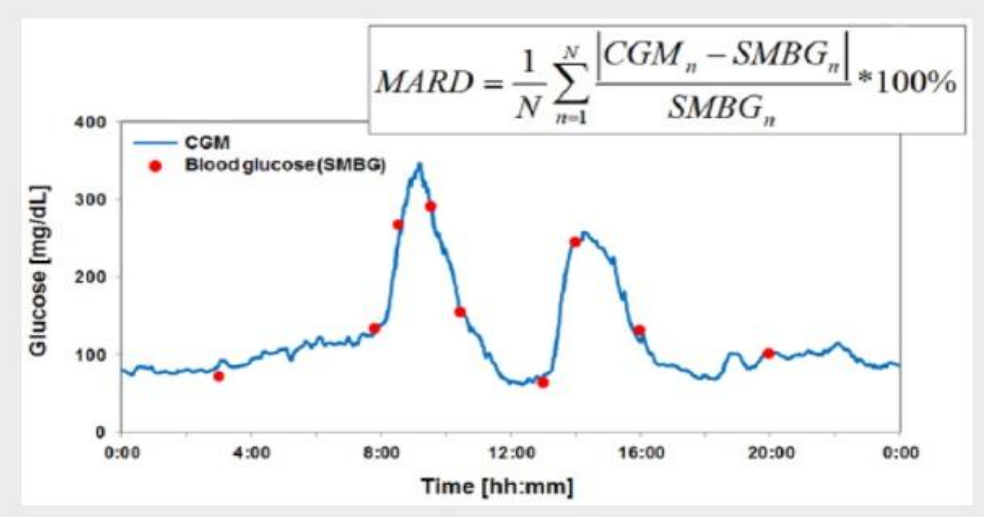
The MARD quantifies the difference between the CGM readings and the reference blood glucose values obtained from a laboratory blood glucose meter. It is expressed as a percentage of the reference blood glucose value. The calculation involves taking the absolute value of the difference between the CGM reading and the reference values, dividing it by the reference value, and calculating the average of these values over a specific time period, typically 24 hours. A lower MARD indicates greater accuracy by the CGM system, as it signifies a smaller average

[4] Cappon G, Vettoretti M, Sparacino G, Facchinetti A. Continuous Glucose Monitoring Sensors for Diabetes Management: A Review of Technologies and Applications. Diabetes Metab J. 2019 Aug;43(4):383-397. doi: 10.4093/dmj.2019.0121. PMID: 31441246; PMCID: PMC6712232.

difference between the CGM readings and the reference values. The MARD serves as a primary metric for evaluating the performance of CGM systems and comparing this to other CGM systems or a reference standard. It is worth noting that factors like sensor stability, measurement noise, sensor lag, and algorithms also contribute to the accuracy of CGM systems.

Currently, the market-leading CGMs report MARD figures in the 8–9% range, with the most recent iterations approaching 8%.

Mean absolute relative difference (MARD)



Source: Abbott Laboratories

Patient convenience and QoL-improvement

In addition to accuracy, patient convenience and improved quality of life are pivotal in influencing patient preference for a specific CGM. Various aspects contribute to the value proposition of CGMs in terms of enhanced convenience. Most CGMs are compatible with a dedicated receiver or a smart device, such as a phone or watch, and other wearables, and there is often a preference for watches or mobile phones among individuals.

The size and placement of the sensor are significant considerations, as patients generally favour smaller sensors since larger ones are less convenient and at greater risk of accidental detachment. At the same time, most patients appreciate the aesthetic aspect of a smaller sensor attached to their bodies.

To ensure accurate readings, calibration is necessary for some CGMs, with the frequency varying based on the type and brand. Calibration requirements range from as often as every 12 hours to not being required at all, depending on the specific CGM, with an obvious preference for fewer calibrations. The current market leaders, Dexcom G7 and Freestyle Libre 3, have established the standards of no calibration requirements and sensor longevity of up to 10–14 days, with the application of a new sensor a relatively straightforward procedure that can be done by the patient at home.

Another approach is offered by the Eversense E3, which provides up to six months' longevity and is inserted by a physician under the skin in the upper arm rather than the arm or abdomen. Like Dexcom and Libre, however, a transmitter is worn over the sensor to wirelessly transmit the data to a smartphone, which somewhat reduces the convenience.

Insulin pump integration

Patients who use an insulin pump typically prioritise a CGM that is compatible and integrated with their pump. Numerous studies have demonstrated that this integrated technology can improve glycaemic control, as seen in decreased HbA1c levels. The benefits stem from the automated and algorithmic treatment approach, which mitigates human error and enables swift responses to rising blood glucose levels, surpassing the capabilities of manual injection methods.

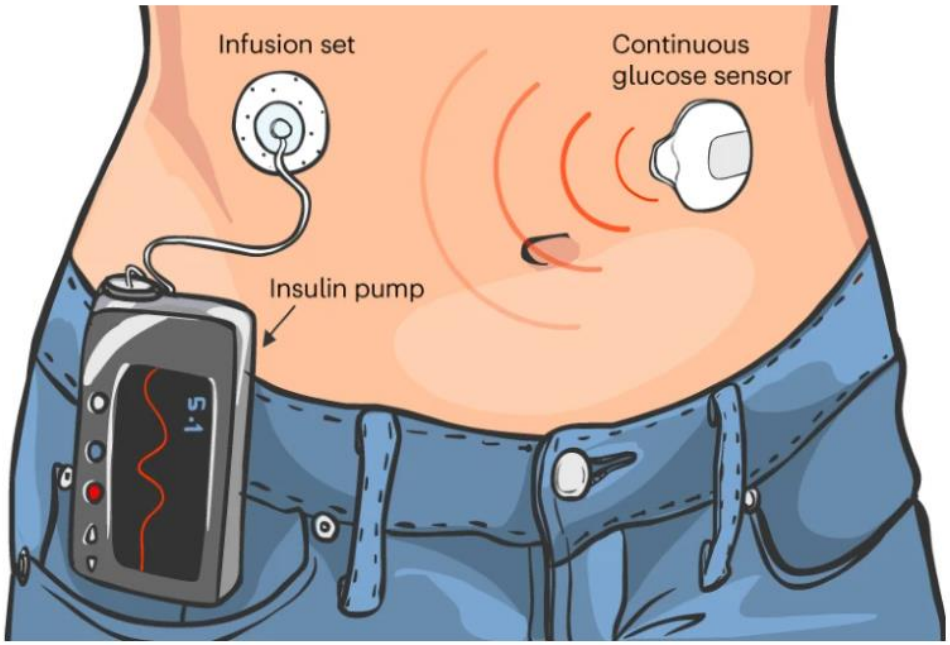
Several CGM systems currently available are compatible with closed-loop insulin pump systems, commonly known as artificial pancreas systems. These closed-loop systems integrate an insulin pump, a CGM, and a computer algorithm to automatically adjust insulin delivery in response to changes in blood glucose levels. The objective is to maintain blood glucose levels within a targeted range, minimising hypoglycaemia and hyperglycaemia risks.

The CGM continuously measures glucose levels in the interstitial fluid beneath the skin and transmits this information to the algorithm, which processes the data using predetermined rules to calculate the optimal amount of insulin to deliver via the insulin pump. The insulin pump administers the insulin subcutaneously through a small cannula.

The closed-loop system aims to keep blood glucose levels within the desired range, and it can adapt insulin delivery based on variables like exercise, stress, and meals.

Compared to traditional insulin pump therapy, which relies on patients inputting glucose levels and insulin doses, the closed-loop system provides more accurate insulin dosing. This integrated insulin pump technology is an innovative approach offering the potential to enhance glycaemic control and improve the quality of life for diabetics

CGM with integrated insulin pump example



Source: Nature

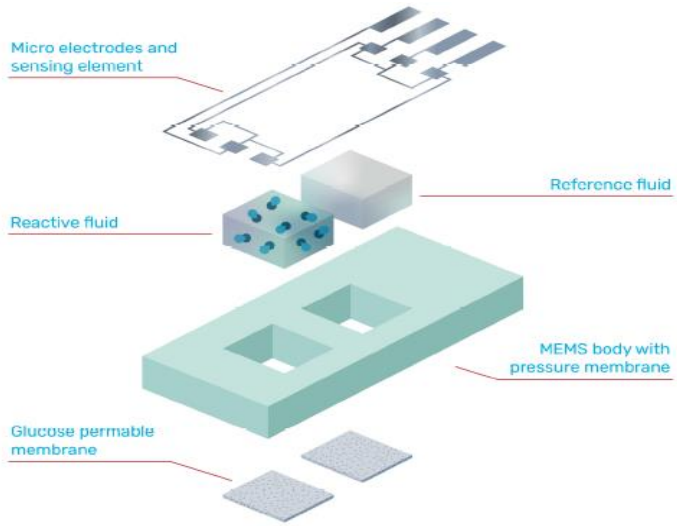
Sencell

Lifecare specialises in the development of miniaturised and implantable nano biosensors. Its Sencell CGM represents a significant advancement in glucose monitoring technology, using osmotic pressure and nanotechnology for continuous blood sugar level measurement. Sencell is the first CGM to leverage osmotic pressure in blood glucose monitoring.

Furthermore, this innovative micro-sensor is set to become the world's smallest system of its kind, measuring no larger than a grain of rice and being implanted beneath the patient's skin. The design of Sencell involves implanting it in the subcutaneous tissue of the forearm, positioned next to a watch-like readout unit. This readout unit powers the sensor through an inductive power supply, enabling wireless data retrieval and providing real-time, precise glucose readings by measuring osmotic pressure. Initially, Sencell aims to have a lifespan of six months, with the possibility to extend this to 12 months in the future.

According to Lifecare, this technology also holds promise for measuring other biomarkers, which could expand its market applications in the future.

Sencell sensor



Source: Lifecare

Lifecare has successfully reduced the size of sensors used in clinical applications from centimetres to millimetres, in contrast to their larger counterparts used in-vitro and pre-clinical activities. To achieve the necessary miniaturisation, Lifecare has obtained a licence for a manufacturing process that constructs sensing elements at the nano-scale through focused electron-beam induced deposition. By employing modified electron microscopes equipped with a gas injection system, Lifecare enables a direct-write technology to deposit nanoscale pressure (strain) sensors.

The final iteration of Lifecare's Sencell sensor should have a chamber volume of 500–700nL, comparable to the size of a grain of rice. During the pre-clinical stage, the sensor's size limitation was the piezo-resistive pressure transducers used in the core sensor technology. However, this issue was resolved by replacing the larger pressure transducers with tiny nano-granular tunnelling resistive (NTR) pressure sensors, which measure just 4,000 x 400 x 150 nm after miniaturisation.

Sensor miniaturisation

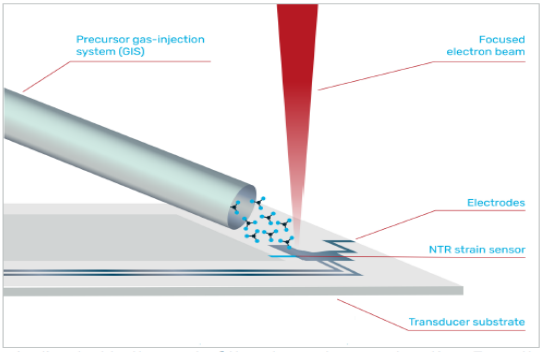


Figure 4 An electron beam is directed to the spot of the planned sensor location. From the side, a metal-organic precursor gas flow is directed to the same spot. In the focus of the electron beam, previously adsorbed precursor molecules are dissociated, resulting in a permanent deposit. The deposit microstructure is that of a nano-granular metal if the precursor gas species is properly chosen. The final size, and the structure of the „printed" product are defined by the software-controlled process and can be adapted as desired.

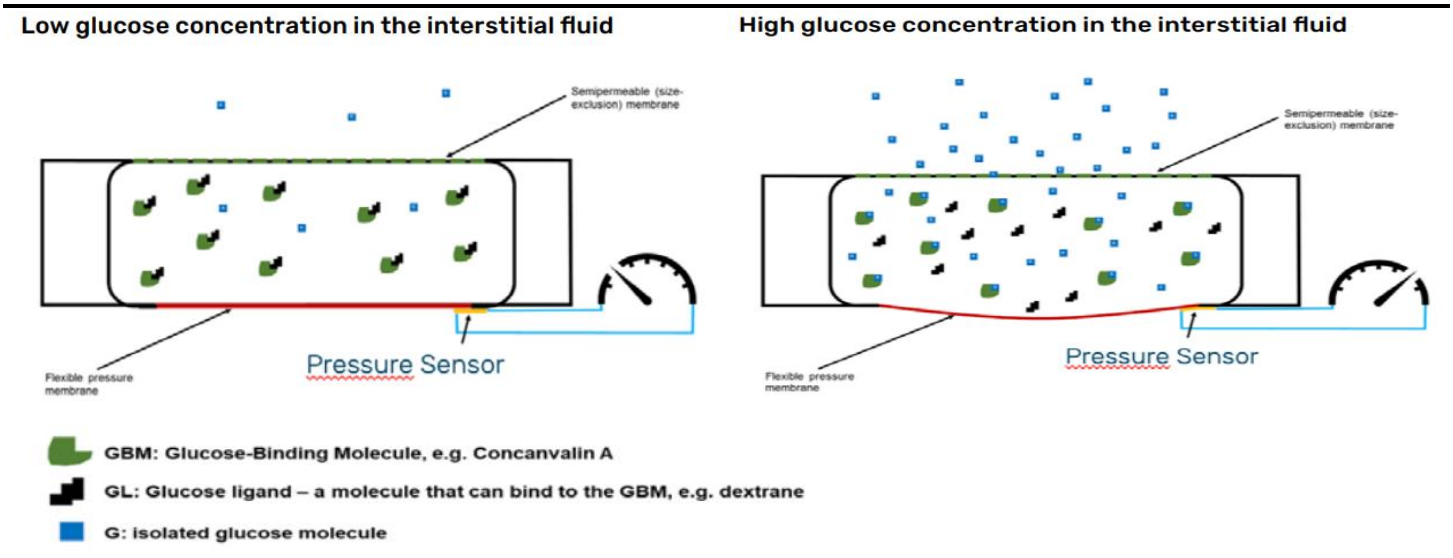
Source: Company presentation

In simple terms, Sencell functions based on the principles of osmotic pressure: as glucose levels increase, so too does osmotic pressure; and conversely, as glucose levels decrease, so does osmotic pressure. Sencell can monitor these changes in real-time, providing an accurate and instantaneous reading of the patient's blood sugar levels, correlated with the body's glucose levels.

Sencell and its CGM system employ osmotic pressure technology based on biochemical reactions with increased pressure when glucose molecules connect to molecules in a closed chamber. This pressure change is then detected and measured, enabling accurate and continuous monitoring of glucose levels. As glucose molecules penetrate the semipermeable membrane and enter the chamber, glucose ligand (GL) molecules dissociate from the glucose-binding molecule (GBM) binding sites.

This is because glucose has a slightly higher binding affinity to the GBM receptor, causing the GL molecules to be released.

How the sensor works



Source: Company presentation

The process is completely reversible, as a decrease in glucose concentration causes glucose molecules to disconnect, leading to a decline in osmotic pressure. There is a direct correlation between the glucose concentration in the external fluid and the measurable osmotic pressure in the chamber. The technology does not consume any molecules when generating the signal, making it ideal for long-term usage inside the body.

Comparison with currently marketed CGMs

To better understand its value proposition and, in turn, its commercial opportunity, we have compared Sencell to the latest CGM iterations from the market leaders Abbott Laboratories (Freestyle Libre 3) and Dexcom (Dexcom G7). We have also included the latest iterations from Medtronic (Medtronic Guardian 4) and Senseonics (Eversense E3), which hold a smaller proportion of the market.

CGM comparison

CGM Product	Sencell	Dexcom G7	Eversense E3	Freestyle Libre 3	Medtronic Guadian 4	Competitor Average
Company	Lifecare	Dexcom	Senseonics	Abbott	Medtronic	
MARD (%)	9,6%*	8,2%	8,5%	7,9%	8,7%	8,3%
Sensor logenvity (weeks)	26**	1,5	26	2	1	7,6
Warm-up time (hours)	0,5-1	0,5	24	1	2	6,9
Reading frequency (minutes)	<5	5	5	1	5	4,0
Senzor size (mm)	1x0.5x0.25	24x24x2	16x4x4	19x19x3	19x11x10	20x15x5
Approximate annual cost (USD)	650	4 000	3 300	1 700	4 200	3 300
Placement	Under skin	Arm/abdomen	Under skin	Arm	Arm/abdomen	N/A
Integrable with insulin pump	No	Yes	No	Yes	Yes***	N/A
Calibration required?	No	No	Every 12 hours	No	Every 12 hours	N/A
Requires transmitter to transfer data to phone / wearable	Yes	No	Yes	No	Yes	N/A

*In the LFS-SEN-001 trial, MARD is likely to further decrease ahead of becoming commercially available

**Estimated minimum of 26 weeks

***Only integrable with Medtronic insulin pump

A more comprehensive review of available CGM's can be found in the appendices

Source: Company data, Redeye research

In late June, Lifecare made an announcement regarding Sencell's MARD based on the LFS-SEN-001 trial, revealing a MARD of 9.6%, placing it slightly above the most recent iterations of the current market leaders. However, in this context, it is important to consider that Sencell is the first sensor based on osmotic pressure.

Moreover, the combination of increased data availability and improved algorithms has enhanced the accuracy of CGMs. This improvement is achieved through various means, including the development of sophisticated algorithms that can be customized to individual needs and continuously optimized. As a result, the MARD of market-leading sensors has significantly reduced over time, currently ranging between 8% and 10%. This is a notable improvement compared to the initial generation of interstitial fluid sensors, which had MARD figures ranging from 13% to 15%. In this context, Sencell's MARD of 9.6% becomes even more significant.

Furthermore, these initial figures from Sencell are comparable to the performance of the Dexcom G6 (MARD: 9%) and Freestyle Libre 2 (MARD; 9.3%), both of which still possess considerable market penetration. From our perspective, this presents an intriguing opportunity for Sencell's future development. We foresee the potential for a further reduction in the MARD through increased algorithm sensitivity and the implementation of additional efficiency measures, which could make it challenge and potentially surpass even the most recent iterations from Dexcom and Freestyle in terms of accuracy.

Aside, accuracy Sencell offers many benefits similar to the current market leaders Dexcom and Freestyle Libre, including not requiring calibration, quick warm-up, and high reading frequency. Additionally, its superior sensor longevity and secure subcutaneous placement provide further convenience compared to on-body sensors, which carry a risk of accidental detachment. These aspects, along with the aesthetic preference for under-the-skin placement, should make Sencell an appealing option for many patients. It is worth mentioning that the Eversense E3 device shares several similarities with Sencell, such as being implanted under the skin and offering long sensor longevity, making it the closest alternative to Sencell among the currently available options. However, when considering the need for twice daily calibration, a 24-hour warm-up time, and the characteristics of the transmitter, which we believe result in increased inconvenience for patients, Sencell emerges as the preferred option.

Furthermore, Lifecare has emphasized that Sencell possesses the potential to be substantially more affordable when compared to currently available sensors, which typically range from approximately USD 1700 to 4200 per year. The company has estimated that Sencell will have an approximate cost of cEUR650 (equivalent cUSD700) per year. This affordability factor is expected to play a significant role, considering the projected exponential growth in the CGM market and the increasing adoption of CGM technology among patients with T2D.

We want to emphasise our belief the integration of Sencell with smart devices like phones and watches, and its potential availability for future integration in closed-loop systems, is significant for its long-term market opportunity. We believe patients and physicians will increasingly request this due to its impact on long-term HbA1c levels in reducing complications from the disease. The company has mentioned that these integrations will primarily depend on future partnerships, but it is committed to developing Sencell to be compatible with such scenarios as they arise.

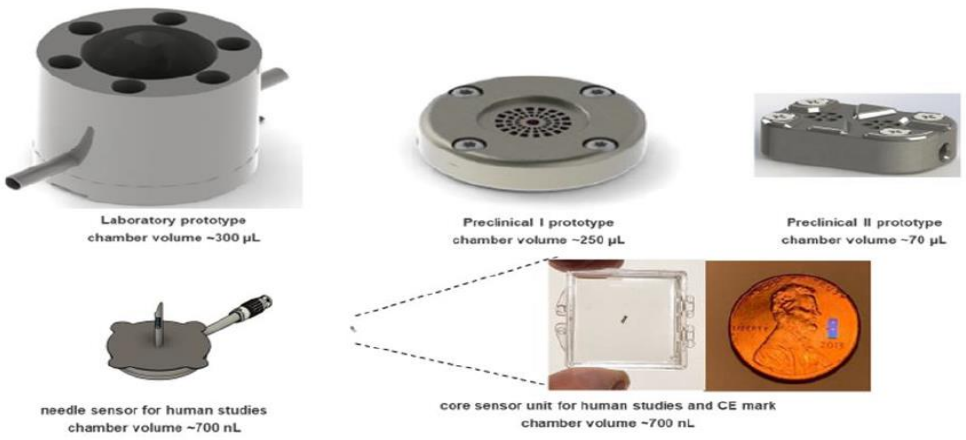
Overall, we perceive a distinct value proposition when comparing Sencell to body-attached sensors, particularly in terms of convenience and extended sensor longevity. We observe that it excels in areas where Eversense E3, falls short, and we believe this positioning will appeal to many patients. The attractive price tag should also facilitate adoption on the back of the clear health economic benefit compared to currently available options. Accordingly, we believe Sencell will be able to secure a piece of the multi-billion USD CGM market.

Clinical validation

In early development, larger sensors have been used with promising results. However, to be clinically useful and commercially relevant, the sensor must be miniaturised down to the size of a rice grain (1x0.5x0.25mm). Lifecare has obtained a licence for a manufacturing process that utilises focused electron-beam-induced deposition to achieve miniaturisation of nano-scale sensing elements. The miniaturised sensors were created through the precise deposition of material using focused electron beams and Nano3Dsense technology. This involved directing the electron beam and gas flow to the same spot, resulting in a permanent deposit of nano-granular metal. The size and structure of the final product were controlled using software.

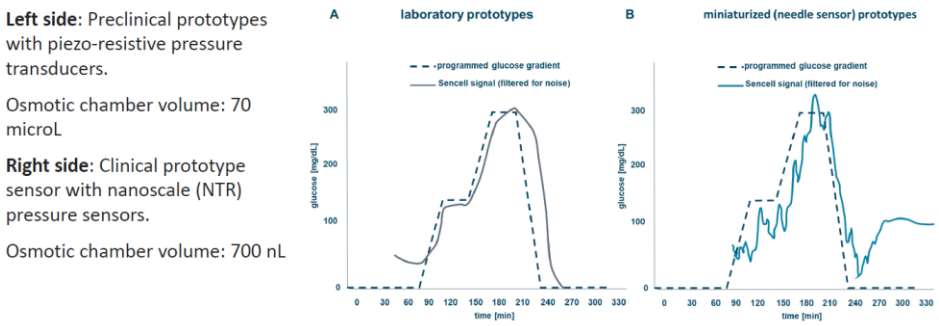
In the latest glucose sensor design, a pressure sensor is strategically positioned at the chamber's base, complementing the semipermeable membrane that covers the upper section. This pressure sensor closes a small gap between two gold electrodes. As pressure increases, the sensor membrane undergoes movement and strain, leading to a change in resistance in the sensor element. This element seamlessly integrates into a Wheatstone bridge circuit. This advanced sensing technology enables the creation of a smaller osmotic pressure chamber with a volume of 750nL while reducing the operating voltage to 100mV.

Sensor minituarisation



Source: Company presentation

Clinical prototype sensors: performance and sensitivity



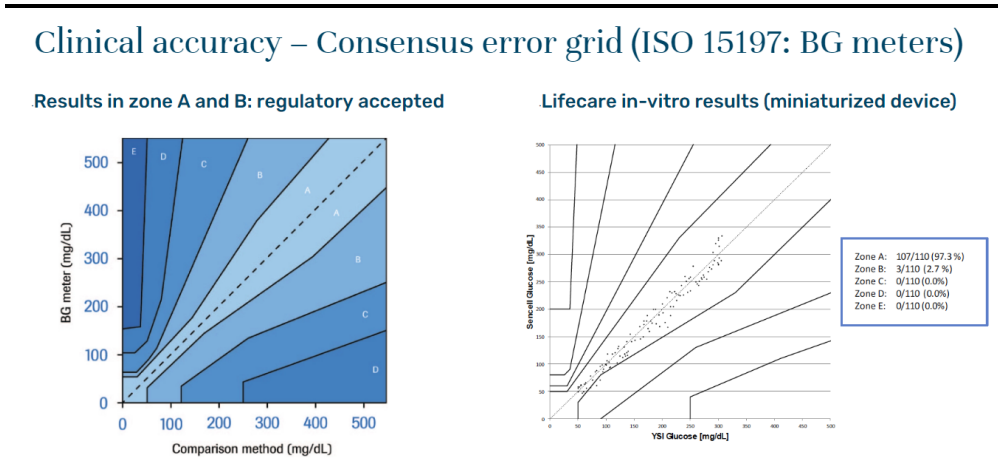
Source: Company presentation

In June 2022, Lifecare initiated the clinical development study LFS-SEN-001 to establish proof-of-concept functionality in human tissue and to optimise signal reading from the sensor. By September 2022, early results from the study revealed that the sensor effectively tracked

glucose variations in humans with a sensitivity comparable to widely used CGMs and consistent with previous animal trials. These findings also indicated Lifecare's potential to achieve the planned minimum longevity of Sencell, set at six months.

The study was concluded in Q2 2023, and the results were presented during the scientific program of the American Diabetes Conference in San Diego on 23-26 June. During this presentation, Lifecare announced that Sencell's MARD in the study amounted to 9.6%. Furthermore, to comply with ISO 15197 standards, the data points must fall within the A and B areas of the consensus error grid. The study successfully achieved this requirement, as illustrated below.

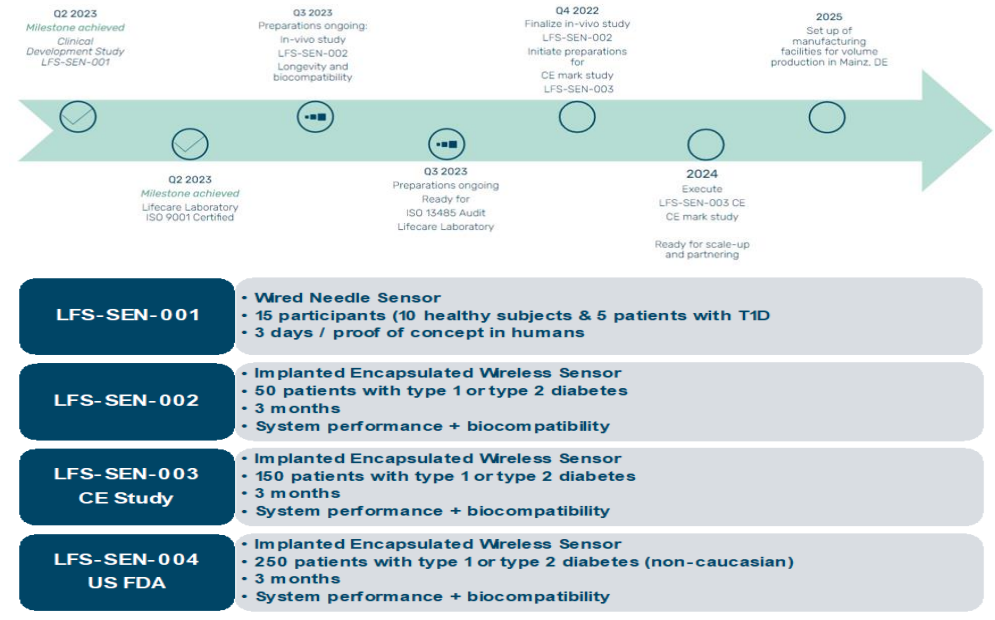
Clinical prototype sensors: performance and sensitivity



Source: Company presentation

Following this, Lifecare will evaluate the first sensor longevity development study (LFS-SEN-002), which will evaluate the longevity and biocompatibility of Sencell in-vivo. The trial is anticipated to commence mid-year 2023, with a duration of around six months, implying a readout at the end of 2023 or in early 2024.

Lifecare's clinical validation roadmap



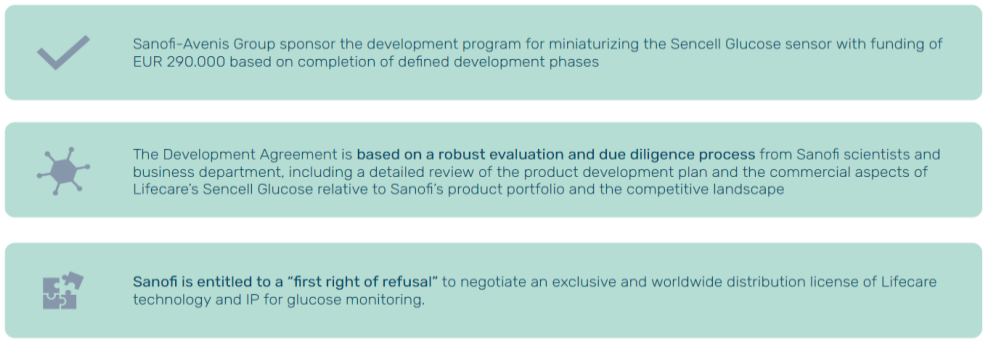
Source: Company presentation

The abovementioned timeline would suggest a CE mark-enabling study by 2024 and manufacturing facilities established in 2025, with a potential market launch by H2 2025.

Sanofi has a right of first refusal on Sencell

Lifecare has entered into a development agreement with pharma giant Sanofi (more than 100,000 employees), which has a particular focus on diabetes and a few other therapeutic areas. According to the agreement, Sanofi sponsors Lifecare with cEUR0.3m (tied to development milestones) to accelerate the development programme for miniaturising the Sencell sensor. Moreover, the development agreement also entitles Sanofi to right of first refusal (ROFR), which lasts until Lifecare has acquired a CE marking for Sencell and gives Sanofi the option to buy the rights to the technology and IP of Sencell's glucose monitoring ahead of any other potentially interested party.

Product development agreement with Sanofi



Source: Company presentation

Market overview and potential

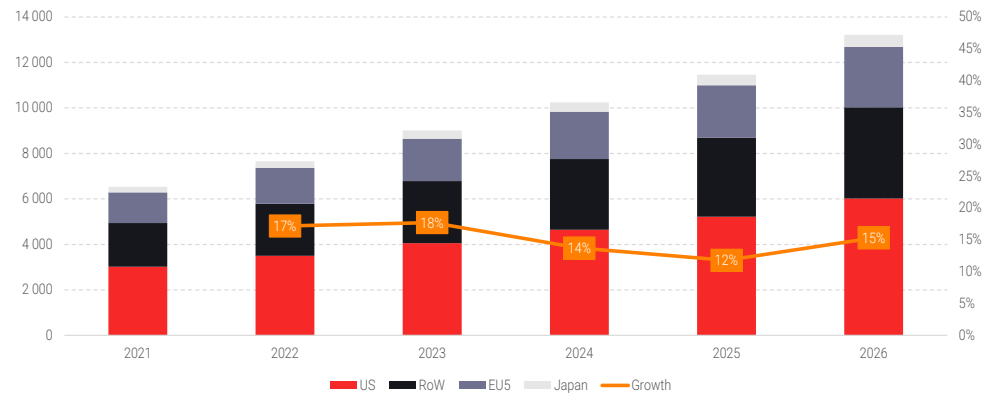
Continuous glucose monitors (CGMs) provide a range of benefits, including enhanced convenience, reduced discomfort, and a remarkable ability to significantly improve glycaemic control, mitigate diabetes-related complications, and enhance overall quality of life. These advantages, combined with factors like extensive advertising and promotional campaigns, increased physician referrals, and heightened user awareness, should drive significant growth in the blood glucose monitoring market, particularly in the CGM system segment. The US is anticipated to experience the most substantial market growth, with steady expansion also expected in other international markets.

According to a Meddevicetracker report, the global market for blood glucose monitoring devices is projected to grow at a CAGR of 10.7% in 2021–2026. The growth will primarily occur in the CGM market, which is expected to show a CAGR of 15.1%. By contrast, the BGM market is anticipated to grow at a slower pace of 3.1%. In 2021, global sales of blood glucose monitoring devices reached approximately USD11.3bn, with CGMs accounting for just under 60% of total sales and BGMs representing around 40%. By 2026, sales are projected to surge to nearly USD18.8bn, with CGMs expected to have captured more than 70% of the overall market.

The market also faces some limitations, though, including:

- The high cost of CGMs and disposable sensors makes it hard to justify their use for the majority of T2D patients
- The need for a smartphone and internet connectivity for CGMs may limit access for people in less developed regions or with limited incomes
- Export licensing requirements on microchips and chip-making equipment in China could hinder production capabilities for some blood glucose monitoring devices.

CGM market forecasts for 2021–2026



Source: Meddevicetracker (Informa)

In 2019, Abbott Laboratories accounted for c50% of the CGM market in terms of sales, closely followed by Dexcom with c38% of the market. Medtronic had c11% and Senseonics c1%. These four parties still represent almost 100% of the CGM market today.

A more elaborate discussion of competitors can be found in the appendices.

Apple could potentially enter the CGM market

In 2018, Apple published a patent application detailing a potential non-invasive glucose monitoring solution. The application describes a method utilising an optical system for absorption spectroscopy, allowing the device to measure the concentration of a substance in a sample. By comparing the transmitted light with reference light, the system can detect changes in absorbance caused by the substance. This development hints at Apple's interest in diabetes-tracking technology, which has long been sought-after in the field of medical science. In addition, different substances have distinctive "absorbance peaks" that indicate their varying ability to absorb light at specific wavelengths. When light with known properties is applied, each substance exhibits a unique spectral fingerprint based on its absorption characteristics.

Apple's patent application acknowledges the limitations of non-invasive substance detection, including the presence of multiple substances in a sample and variations in substance distribution. It incorporates specialised components like light emitters, filters, and detectors to address these challenges. Beam-splitters are used to create multiple light paths, allowing for comparison and to reduce errors. The application also describes using micro-optics and measuring various properties of reflected light to determine substance concentration. Apple emphasises the importance of constant calibration to ensure accurate results.

The patent application from Apple suggests the possibility of measuring substances, including glucose, non-invasively through the skin. While the application does not explicitly mention glucose monitoring, it aligns with rumours of Apple's interest in developing such a feature for the Apple Watch. The proposed method utilises light-based detection techniques, potentially including Raman spectroscopy to analyse the molecular fingerprint of a substance by measuring scattered light. Apple's interest in this technology is noteworthy, as it has reportedly hired former employees from a company that attempted to incorporate Raman spectroscopy into a smartphone-connected glucose monitoring device. Additionally, Apple's CEO, Tim Cook, was rumoured to have tested a non-invasive blood sugar monitoring device prototype, additional discussion of Apple's interest in the segment.

Conclusion and discussion on the potential threat from Apple

We emphasise that a non-invasive CGM solution has the potential to disrupt blood glucose monitoring and can be seen as a significant advancement. It is important to consider the involvement of a major player like Apple in this field. Apple has already utilised similar technology for blood oxygen measurement in the Apple Watch, and it has expressed an interest in the healthcare segment in previous statements. For instance, in a 2019 interview with CNBC, CEO Tim Cook stated: "I believe, if you zoom out into the future, and you look back, and you ask the question, 'What was Apple's greatest contribution to mankind?' It will be about health."

However, since the disclosure of these patents in 2018, there has been little concrete information beyond speculation. In addition to the inherent challenges involved in developing such a technology – which would necessitate significant further progress – it is crucial to account for regulatory complexities and the current established ISF measurement standards. Consequently, the prospect of a non-invasive CGM product materialising in the near future appears unlikely. Even if such a development were to occur later on, ISF glucose monitors already have an established presence in the market. They are likely to keep their market opportunity, albeit smaller for innovative products with an appealing value proposition for patients, such as Sencell.

Market opportunity for Sencell

As mentioned earlier, the CGM market caters to a diverse population of patients with varying preferences. This creates an opportunity for differentiated products that offer significant value in terms of patient convenience and accuracy. In addition to its solid value proposition, Sencell will also be able to compete through a lower price tag than the competitors, we believe.

To develop our market forecasts, we rely on the diagnosed prevalence of T1D[5] and T2D[6] patients in key regions, namely the US, EU5 (France, Germany, Italy, Spain, and the UK), and Japan. This approach ensures our model is built on reliable and robust data, considering that CGMs are predominantly utilised in developed countries, constituting the primary target market. While recognising the potential in other regions, we adopt a more conservative approach due to the remaining development risks, treating expansion into additional geographies as optionality on the upside. Accordingly, our forecasts in terms of TAM are likely on the lower end.

Subsequently, we extrapolate this data to identify specific subgroups we believe will benefit the most from Sencell in terms of patient convenience and health economics. It is important to note our primary target audience for Sencell is T1D patients. However, we also acknowledge that insulin-treated T2D patients form a subgroup that can benefit from using Sencell.

T1D addressable patients

A US trial published in October 2021 investigated the use of CGMs among patients with T1D. The study evaluated a sample of 11,469 US patients between 2017 and 2019, of whom 48% used a CGM. Since then, the market for CGMs has nearly tripled in size, and adoption continues to increase.

In developed economies, which we argue will represent the primary market opportunity for Sencell, CGM usage among T1D patients is likely to have surpassed 75% and approaching 100% among children, young adults, and newly diagnosed individuals. We thus conservatively assume that 80% of T1D patients in our targeted economies use a CGM.

T2D addressable patients

While it is highly probable that a significant portion of T2D patients would benefit from using a CGM, considering the health economics, it is reasonable to assume that primarily, if not exclusively, insulin-treated T2D patients would be eligible for a CGM. This subgroup accounts for approximately 30% of T2D patients[7].

Addressable patients

Based on the aforementioned information, we arrive at an estimate of approximately 16 million addressable patients in 2023 within the targeted regions. Among them, around 80% are patients with T2D and approximately 20% are patients with T1D. This number represents what we consider as the total addressable market in the US, EU5, and Japan. However, due to our cautious approach, we recognize that our assumptions are likely to be conservative compared to real-world figures. This approach provides a margin of safety for our assumptions.

5 Datamonitor Healthcare, Patient-Based Forecast Model (Published January 2023)

6 Datamonitor Healthcare, Patient-Based Forecast Model (Published January 2023)

7 UCSF Medical Center – Diabetes Education Online

Addressable patients Sencell

		2022	2023e	2024e	2025e	2026e	2027e	2028e	2029e	2030e	2031e	2032e
Diagnosed treated prevalence T1D&T2D	US	24 510 340	24 831 158	25 149 171	25 464 460	25 738 328	26 009 832	26 280 708	26 553 374	26 829 874	27 084 773	27 384 847
	EU5	17 062 213	17 250 558	17 441 998	17 639 435	17 824 060	18 009 587	18 196 915	18 386 375	18 578 524	18 749 591	18 949 314
	Japan	7 138 475	7 177 812	7 214 401	7 247 709	7 264 570	7 276 331	7 285 452	7 295 379	7 308 674	7 313 532	7 332 493
T1D Diagnosed treated prevalence	US	1 598 000	1 616 686	1 635 116	1 653 290	1 669 488	1 685 360	1 701 089	1 716 933	1 733 085	1 748 385	1 763 762
	EU5	1 693 279	1 710 493	1 727 862	1 745 656	1 762 289	1 778 901	1 795 587	1 812 398	1 829 401	1 844 548	1 864 383
	Japan	410 378	412 573	414 609	416 451	417 367	417 987	418 454	418 964	419 666	419 894	420 212
Addressable patients T1D	US	1 198 500	1 212 515	1 226 337	1 239 967	1 252 116	1 264 020	1 275 816	1 287 700	1 299 814	1 311 288	1 322 822
	EU5	1 269 959	1 282 870	1 295 897	1 309 242	1 321 717	1 334 175	1 346 690	1 359 299	1 372 051	1 383 411	1 398 288
	Japan	307 783	309 430	310 957	312 338	313 025	313 491	313 840	314 223	314 749	314 921	315 159
T2D Diagnosed treated prevalence	US	22 912 340	23 214 471	23 514 054	23 811 171	24 068 840	24 324 473	24 579 620	24 836 440	25 096 789	25 336 389	25 621 085
	EU5	15 368 934	15 540 065	15 714 136	15 893 779	16 061 770	16 230 686	16 401 328	16 573 977	16 749 123	16 905 043	17 084 931
	Japan	6 728 097	6 765 239	6 799 792	6 831 258	6 847 203	6 858 343	6 866 999	6 876 415	6 889 009	6 893 638	6 912 281
Addressable patients T2D	US	6 873 702	6 964 341	7 054 216	7 143 351	7 220 652	7 297 342	7 373 886	7 450 932	7 529 037	7 600 917	7 686 326
	EU5	4 610 680	4 662 020	4 714 241	4 768 134	4 818 531	4 869 206	4 920 398	4 972 193	5 024 737	5 071 513	5 125 479
	Japan	2 018 429	2 029 572	2 039 938	2 049 377	2 054 161	2 057 503	2 060 100	2 062 925	2 066 703	2 068 091	2 073 684
Total TAM	**US**	**8 072 202**	**8 176 856**	**8 280 553**	**8 383 318**	**8 472 768**	**8 561 362**	**8 649 702**	**8 738 632**	**8 828 850**	**8 912 205**	**9 009 147**
	EU5	**5 880 640**	**5 944 889**	**6 010 137**	**6 077 375**	**6 140 248**	**6 203 381**	**6 267 088**	**6 331 492**	**6 396 787**	**6 454 924**	**6 523 767**
	Japan	**2 326 212**	**2 339 002**	**2 350 894**	**2 361 716**	**2 367 186**	**2 370 994**	**2 373 940**	**2 377 147**	**2 381 452**	**2 383 012**	**2 388 843**

Source: Meddevicetracker (Informa), Redeye Research

Market penetration

We base our forecasts on the premise that the next decade will witness intense competition and significant developments. We anticipate that Freestyle Libre and Dexcom will maintain strong positions in the market going forward. Nevertheless, given Sencell's strong value proposition, cost advantage, and differentiated approach, we firmly believe it will effectively serve a substantial number of patients and appeal to physicians, enabling it to secure a portion of the market in the long run. Our assumption is that Sencell will capture c5% of T1D patients and approximately c2% of T2D patients over our forecast period.

Commercial partner

As mentioned earlier, our expectation is that Lifecare will establish a partnership agreement to commercialize Sencell. Under this arrangement, we anticipate Lifecare will retain the responsibilities related to development, production, and IP, while the partner will take charge of marketing and distribution. We assume that such a partnership could be announced once Lifecare has obtained the necessary clinical data and regulatory approvals, which likely would entail a structure where Lifecare would receive c50% of the sales, upon which we base our assumptions.

Key assumptions:

- We assume a penetration of c5% of the addressable T1D patients
- We assume a penetration of c2% of the addressable T2D patients
- Every patient using Sencell is prescribed two sensors per year
- We assume Lifecare obtains 50% of Sencell sales from its partner
- Market launch in Europe in 2025 and in the US/Japan in 2026
- A price of cEUR325 per sensor[8], resulting in annual costs of cEUR650 per patient
- EUR/NOK exchange rate of 11.5.

[8] Total cost for sensor and device – current marketed CGM costs range cUSD1700-4200 per year

We have maintained a conservative approach throughout to make sure we have a margin of safety in our forecasts. However, we still end up on Sencell having a significant commercial potential and see that it could generate sales of cNOK127m in its first year on the market, growing to cNOK1bn in 2027.

Market model Sencell

		2022	2023e	2024e	2025e	2026e	2027e	2028e	2029e	2030e	2031e	2032e
Total TAM	US	8 152 102	8 257 691	8 362 309	8 465 983	8 556 242	8 645 630	8 734 757	8 824 479	8 915 505	8 999 624	9 097 335
	EU5	5 965 303	6 030 414	6 096 531	6 164 658	6 228 363	6 292 326	6 356 868	6 422 112	6 488 257	6 547 152	6 616 986
	Japan	2 346 731	2 359 630	2 371 625	2 382 538	2 388 054	2 391 893	2 394 862	2 398 096	2 402 435	2 404 007	2 409 854
Penetration T1D (%)	US					0,5%	1,3%	2,0%	2,8%	3,5%	4,3%	5,0%
	EU5				0,5%	1,3%	2,0%	2,8%	3,5%	4,3%	5,0%	5,0%
	Japan					0,5%	1,3%	2,0%	2,8%	3,5%	4,3%	5,0%
Penetration T2D (%)	US					0,2%	0,5%	0,8%	1,1%	1,4%	1,7%	2,0%
	EU5				0,2%	0,5%	0,8%	1,1%	1,4%	1,7%	2,0%	2,0%
	Japan					0,2%	0,5%	0,8%	1,1%	1,4%	1,7%	2,0%
Penetration T1D (patients)	US	0	0	0	0	6 678	16 854	27 217	37 773	48 526	59 445	70 550
	EU5	0	0	0	6 983	17 623	28 462	39 503	50 747	62 200	73 782	74 575
	Japan	0	0	0	0	1 669	4 180	6 695	9 217	11 751	14 276	16 808
Penetration T2D (patients)	US	0	0	0	0	14 441	36 487	58 991	81 960	105 407	129 216	153 727
	EU5	0	0	0	9 536	24 093	38 954	54 124	69 611	85 421	101 430	102 510
	Japan	0	0	0	0	4 108	10 288	16 481	22 692	28 934	35 158	41 474
Units sold	US	0	0	0	0	42 239	106 681	172 417	239 466	307 866	377 321	448 554
	EU5	0	0	0	33 038	83 431	134 832	187 255	240 716	295 240	350 424	354 170
	Japan	0	0	0	0	11 556	28 935	46 352	63 819	81 369	98 868	116 564
Sales T1D (EURm)	US	0	0	0	0	4,3	11,0	17,7	24,6	31,5	38,6	45,9
	EU5	0	0	0	4,5	11,5	18,5	25,7	33,0	40,4	48,0	48,5
	Japan	0	0	0	0	1,1	2,7	4,4	6,0	7,6	9,3	10,9
Sales T2D (EURm)	US	0	0	0	0	9,4	23,7	38,3	53,3	68,5	84,0	99,9
	EU5	0	0	0	6,2	15,7	25,3	35,2	45,2	55,5	65,9	66,6
	Japan	0	0	0	0	2,7	6,7	10,7	14,7	18,8	22,9	27,0
Total sales (EURm)		**0,0**	**0,0**	**0,0**	**10,7**	**44,6**	**87,9**	**132,0**	**176,8**	**222,5**	**268,6**	**298,8**
Total sales (NOKm)		**0,0**	**0,0**	**0,0**	**126,9**	**526,9**	**1 038,4**	**1 559,0**	**2 088,7**	**2 628,1**	**3 173,9**	**3 529,7**
Lifecare topline (NOKm)		**0,0**	**0,0**	**0,0**	**63,4**	**263,4**	**519,2**	**779,5**	**1 044,4**	**1 314,0**	**1 586,9**	**1 764,8**

Source: Meddevicetracker (Informa), Redeye Research

Financials

Historical financials

2022 was the first year in which Lifecare Group operated as an integrated entity, following the strategic acquisitions of subsidiaries initiated in 2021. Consequently, financial comparisons with previous years paint an imperfect picture.

Revenues and EBIT for 2019–2022 (NOKm)

SEKm	2019	2020	2021	2022
Revenues	**2,1**	**5,4**	**1,6**	**22,1**
Net sales	**0**	**0**	**0**	**0**
Other income	2	5	2	22
Gross Profit	**2,1**	**5,4**	**1,6**	**22,1**
COGS	0	0	0	0
OPEX	**-8,8**	**-7,8**	**-16,9**	**-36,7**
Personnel expenses	0	-1	-2	-11
Other operating costs	-8	-7	-15	-25
EBITDA	**-6,7**	**-2,4**	**-15,3**	**-14,6**
Depreciation/Amortization	0	0	-1	-3
EBIT	**-6,7**	**-2,5**	**-15,9**	**-17,3**
Revenue growth y/y (%)	N/A	161%	-70%	1284%
Gross margin (%)	N/A	N/A	N/A	N/A
EBITDA margin (%)	-325%	-45%	-959%	-66%
EBIT margin (%)	-326%	-46%	-996%	-78%
EPS	-0,08	-0,03	-0,16	-0,15

Source: Redeye research

Until 2021, the company operated under a slim structure with limited revenues and lower costs. However, in 2022, it experienced a substantial surge in revenues, these soaring from NOK1.6m in 2021 to NOK22.1m in 2022. This notable increase can be attributed to Lifecare Laboratory in Mainz obtaining accreditation as a Covid-19 testing centre. Consequently, the company participated in widespread government-funded testing in Germany. Unfortunately, this revenue stream gradually declined throughout 2022 and eventually ceased in 2023. However, the laboratory continues to generate revenues from external laboratory services, and it should remain profitable, albeit at moderate levels going forward.

On the EBIT level, the company's costs increased notably in 2021 and 2022 owing to the organisation's growth, general business development, and the initiation of the first clinical study LFS-SEN-001 leading to a NOK17m loss on the EBIT level in 2022.

Forecasts

We assume moderate growth in the external laboratory services, classified as "Other income" in the income statement, which will be the primary revenue driver for the company ahead of a commercial launch of Sencell, which we pencil in for H2 2025.

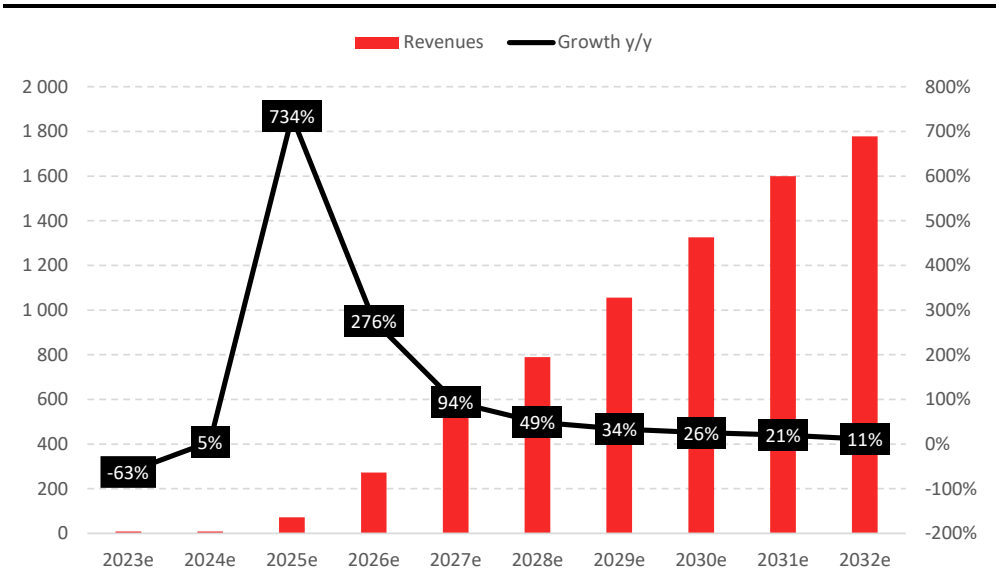
Income statement for 2019–2026e (NOKm)

SEKm	2019	2020	2021	2022	2023e	2024e	2025e	2026e
Revenues	**2**	**5**	**2**	**22**	**8**	**9**	**73**	**273**
Net sales	0	0	0	0	0	0	63	263
Other income	2	5	2	22	8	9	9	10
Gross Profit	**2**	**5**	**2**	**22**	**8**	**9**	**33**	**131**
COGS	0	0	0	0	0	0	-40	-142
OPEX	**-9**	**-8**	**-17**	**-37**	**-50**	**-68**	**-83**	**-88**
Personnel expenses	0	-1	-2	-11	-20	-28	-31	-34
Other operating costs	-8	-7	-15	-25	-31	-40	-52	-55
EBITDA	**-7**	**-2**	**-15**	**-15**	**-42**	**-59**	**-50**	**43**
Depreciation/Amortization	0	0	-1	-3	-4	-4	-5	-14
EBIT	**-7**	**-2**	**-16**	**-17**	**-46**	**-63**	**-55**	**29**
Revenue growth y/y (%)	-41%	161%	-70%	1284%	-63%	5%	734%	276%
Gross margin (%)	100%	100%	100%	100%	100%	100%	45%	48%
EBITDA margin (%)	-325%	-45%	-959%	-66%	-507%	-678%	-69%	16%
EBIT margin (%)	-326%	-46%	-996%	-78%	-550%	-728%	-76%	11%
EPS	-0,1	0,0	-0,2	-0,1	-0,4	-0,5	-0,5	0,2

Source: Company presentation

We have built our top-line estimates based on our sales forecasts for Sencell. We pencil in revenues of NOK73m in 2025, growing to cNOK529m in 2027, implying a CAGR of c170%. We assume that the sales growth trajectory enters a more mature and steady state from 2028 and onwards, eventually reaching cNOK1.8bn in 2032e, which we set as the terminal year.

Revenue distribution (NOKm)



Source: Redeye research

To understand the potential for long-term gross margins in Lifecare, we have investigated mature companies in the CGM space as a reference point for our estimates. However, we acknowledge neither Abbott Laboratories nor Medtronic is a pure CGM play and that Dexcom also offers insulin pumps. However, considering that Lifecare will likely partly compete on price (as stated in its own market assumptions), we assume its gross margins likely will be slightly lower than the average for the peer group, and so we assume a steady-state figure of c50%.

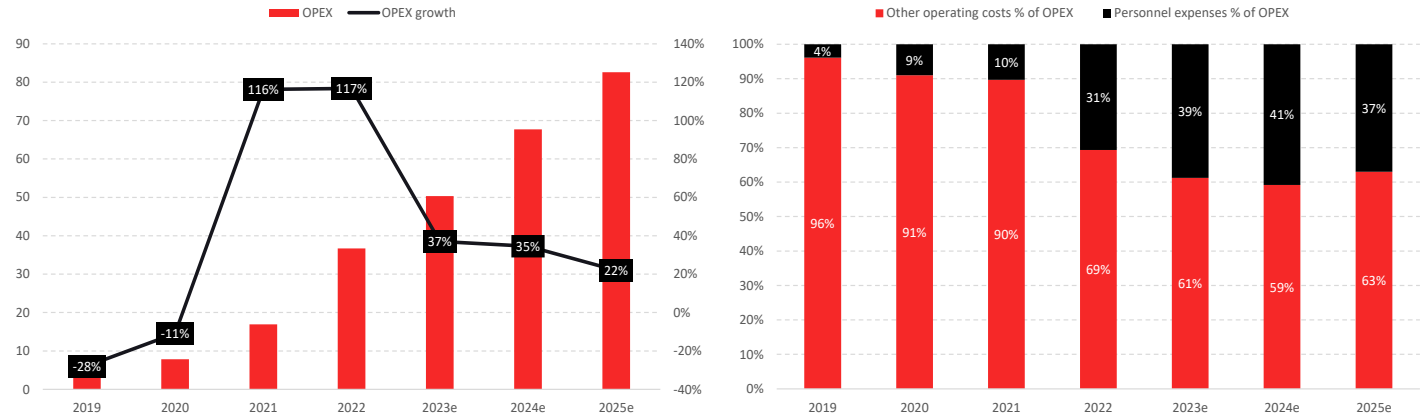
Peer company's gross margins

Gross profit margins	2019	2020	2021	2022
Abbott Laboratories	56%	50%	45%	49%
Dexcom	63%	66%	69%	65%
Medtronic	65%	62%	60%	63%
Average	**61%**	**59%**	**58%**	**59%**

In terms of OPEX, we highlight Lifecare's considerable levels of costs in GBP and EUR, rendering the company somewhat vulnerable to currency fluctuations. However, OPEX will increase over the course of 2023–2025 as a result of the organisation's expansion, such as hiring additional personnel and product development. We assume a gradual increase as the larger studies (LFS-SEN-002 and LFS-SEN-003) are being prepared and then commence and owing to general organisational growth. We assume a gradual rise in OPEX to cNOK80m in 2025e.

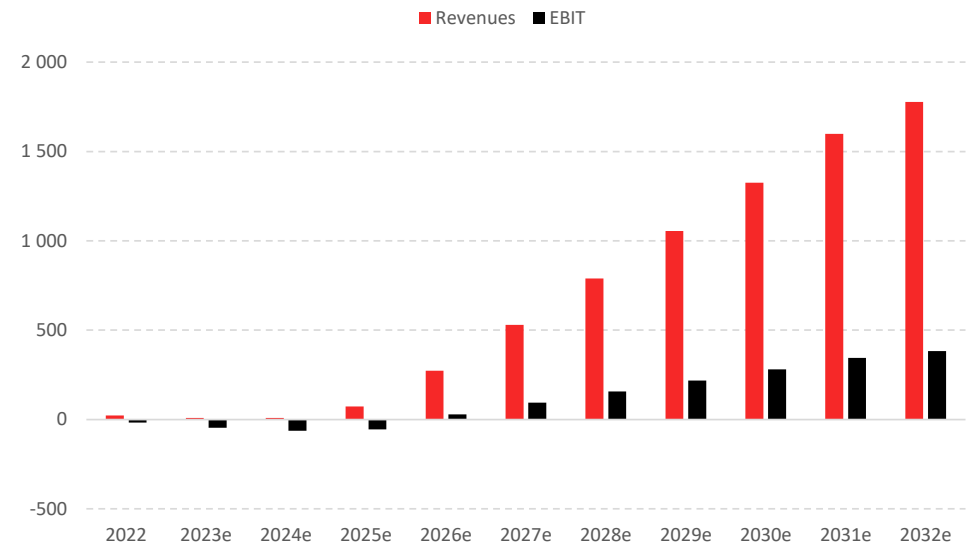
In a longer-term perspective, we see potential for the long-term EBIT margins to stabilise at around the c20% level, which also aligns with mature companies in the CGM space and the medtech industry.

OPEX 2020-2025e (NOKm)



Source: Company presentation

2023e-2032e sales and EBIT (NOKm)



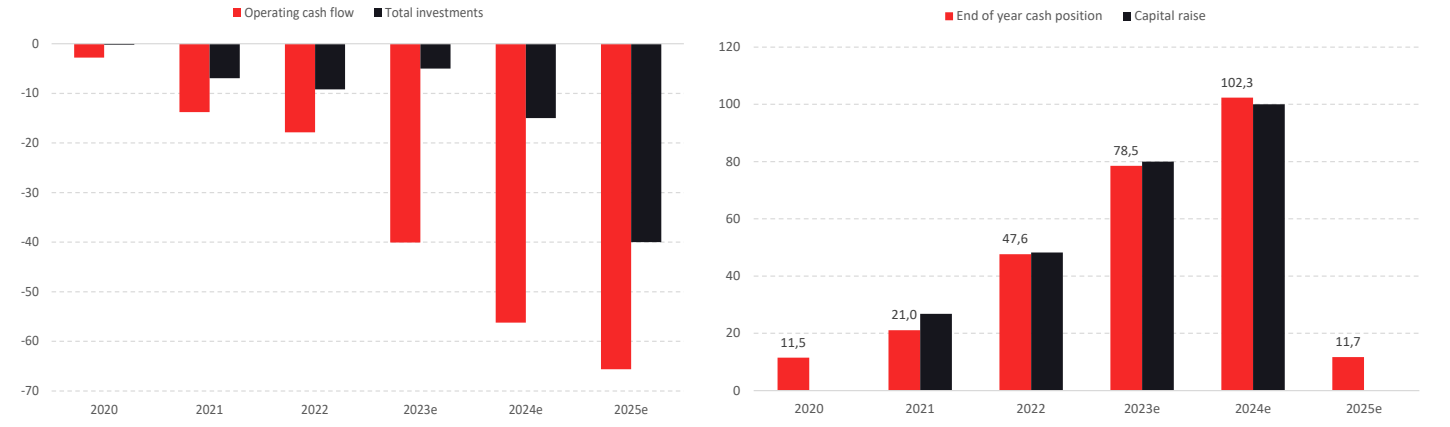
Source: Redeye research

Cash position and financing

At the end of Q1 2023, Lifecare had cNOK37.5m on its balance sheet. However, we anticipate increasing cash burn in the years ahead given Lifecare's planned clinical trials (LFS-SEN-002 and LFS-SEN-003), its commitment to commercialise Sencell, general R&D, and the establishment of manufacturing facilities. We estimate it will need another cNOK150–200m to plug this gap. To account for this, we have modelled two capital injections – one at the end of 2023 and another at the end of 2024 – raising total net proceeds of cNOK180m and resulting in a total dilution of c50%, which we incorporate into our valuation of Lifecare.

We emphasise the uncertainty in our assumptions for the amount raised and the dilution, which we base on the current share price with a discount. Considering we see several high-impact catalysts ahead of these anticipated capital injections, we consider this a conservative approach, as progress is likely to be reflected positively in the share price and, in turn, in our financing assumptions. However, we argue the adjustment provides a better reflection of the fundamental value at present. As such, we will re-evaluate the assumptions for the expected equity issue as needed.

Cash flows, cash position, and financing 2020-2025e (NOKm)



Source: Company presentation

Valuation

At Redeye, we approach the valuation of a company's stock using three scenarios to provide a dynamic view of the case. We also model pessimistic (bear case) and optimistic (bull case) scenarios to complement our base case valuation.

The differences in estimates between the scenarios are based on modifications to the assumptions in our valuation process. However, we apply a WACC of 14.5%, based on: (i) an equity risk premium derived from qualitative and quantitative aspects of the company using our Redeye company quality model; and (ii) Redeye's risk-free interest rate of 2.5%. We use a NOK/EUR exchange rate of 11.5, and our valuation also takes account of a cNOK180m capital raise entailing a dilution of c50%. We do not factor any M&A into our forecasts. We apply these assumptions across our scenarios.

- Base case = NOK3.5 (c80% upside)
- Bull case = NOK9 (c380% upside)
- Bear case = NOK0.5 (c-70% downside)

Base case: NOK3.5

Our base case assumes a European launch of Sencell in 2025, followed by a launch in the US and Japan one year later. Considering the value proposition for patients and the expected health-economic benefits, we anticipate a successful launch that would enable Lifecare to capture 5% of the addressable T1D patients and 2% of the addressable T2D patients for Sencell's usage.

Base case DCF overview

Base case DCF				
Assumptions		**DCF**	**NOKm**	**Per share**
Tax rate	22,0%	2023e-2025e	-73	-0,3
WACC	14,5%	2026e-2031e	255	1,0
Revenue CAGR, 2023e-2025e	195,8%	Terminal	491	1,9
Revenue CAGR, 2026e-2031e	45,5%	Net cash*	208	0,8
Shares outstanding	117,9			
Shares outstanding (diluted)	253,2			
Terminal values, 2032		**Fair value (diluted)**	**881**	**3,5**
Group revenue (SEKm)	1 778	Upside from current price		83%
Terminal growth	2%			
EBIT margin	20%			

*Including net proceeds from capital injections

Source: Redeye Research

Sensitivity analysis

Our valuation of Lifecare is affected by the WACC we attribute to the company, along with our assumptions for terminal EBIT margin and terminal growth rate. We illustrate the impact of applying changes to these variables on our base case valuation in the sensitivity analysis below.

Sensitivity analysis

Terminal EBIT margin	Weigthed Average Cost of Capital (WACC)				
	16,5%	15,5%	14,5%	13,5%	12,5%
16,0%	2,5	2,7	3,0	3,3	3,6
18,0%	2,7	2,9	3,2	3,6	4,0
20,0%	2,9	3,2	3,5	3,9	4,3
22,0%	3,1	3,4	3,7	4,2	4,7
24,0%	3,3	3,6	4,0	4,5	5,1

Terminal Growth	Weigthed Average Cost of Capital (WACC)				
	16,5%	15,5%	14,5%	13,5%	12,5%
1,0%	2,8	3,0	3,3	3,7	4,1
1,5%	2,8	3,1	3,4	3,8	4,2
2,0%	2,9	3,2	3,5	3,9	4,3
2,5%	2,9	3,2	3,6	4,0	4,5
3,0%	3,0	3,3	3,7	4,1	4,7

Source: Redeye Research

Bull case: NOK9

Our bull case is built upon the foundations of our base case but envisions an even more successful launch, resulting in a greater penetration in both patient groups. In this scenario, we anticipate capturing 10% of the addressable T1D patients and 5% of the relevant T2D patients, creating a substantial market opportunity that would position Lifecare as a highly profitable company.

Bull case DCF overview

Bull case DCF				
Assumptions		**DCF**	**NOKm**	**Per share**
Tax rate	22,0%	2023e-2025e	-3	0,0
WACC	14,5%	2026e-2031e	834	3,3
Revenue CAGR, 2023e-2025e	542,5%	Terminal	1 259	5,0
Revenue CAGR, 2026e-2031e	35,4%	Net cash*	208	0,8
Shares outstanding	117,9			
Shares outstanding (diluted)	253,2			
Terminal values, 2032		**Fair value (diluted)**	**2 298**	**9,1**
Group revenue (SEKm)	4 114	Upside from current price		378%
Terminal growth	2%			
EBIT margin	20%			

*Including net proceeds from two equity issues

Source: Redeye Research

Bear case: NOK0.5

Our bear case considers the possibility of Lifecare facing challenges during the development process, resulting in delays to market launch. Furthermore, we assume Sencell fails to generate the expected traction among patients, resulting in limited usage. These circumstances would create difficulties for the company in achieving profitability.

Bear case DCF overview

Bear case DCF				
Assumptions		**DCF**	**NOKm**	**Per share**
Tax rate	22,0%	2023e-2025e	-39	-0,2
WACC	14,5%	2026e-2031e	-57	-0,2
Revenue CAGR, 2023e-2025e	5,0%	Terminal	27	0,1
Revenue CAGR, 2026e-2031e	36,1%	Net cash*	208	0,8
Shares outstanding	117,9			
Shares outstanding (diluted)	253,2			
Terminal values, 2032		**Fair value (diluted)**	**139**	**0,5**
Group revenue (SEKm)	70	Downside from current price		-71%
Terminal growth	2%			
EBIT margin	20%			

*Including net proceeds from two equity issues

Source: Redeye Research

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Appendices

Management and board

Management

Name	Position	Shares	Options
Joacim Holter	CEO		
	Joacim Holter has 16 years of management experience, including 6 years leading international R&D and product development in Switzerland. He has also held board positions, including chairman and member of the Lifecare Board of Directors from 2011 to 2020. Holter holds an LL.M degree from the University of Bergen, Norway.	1 649 352	1496115
Andreas Pfützner	CSO		
	Andreas Pfützner has been the Managing Director of PFÜTZNER Science & Health Institute GmbH, a Diabetes Center & Practice based in Mainz, Germany, since 2013. He is also a Professor of Internal Medicine and Laboratory Medicine at DTMD University Luxembourg. With over 30 years of experience, Pfützner has made significant contributions to pharmaceutical and device development in the field of diabetes technology.	2 620 499	746 058
David C. Klonoff	Chairman, Scientific Advisory Board		
	David C. Klonoff is a highly accomplished professional, serving as a Clinical Professor of Medicine at UCSF, Editor-in-Chief of DST, Medical Director at INST, Chairman of DTM and ADA, and having chaired institutions such as FDA, NASA, US Army, NIH, and NSF. He has also provided consulting services to renowned companies like Sanofi, Google, and Insulin.		
Asle Wingsternes	Head of Communications & Public Affairs		
	Asle Wingsternes has 20 years of experience in the field of communications, including 13 years as a manager and has been part of management teams in several businesses. Broad political experience through leadership positions, as an elected official and full-time politician. Has board experience from various businesses. Holds a degree in Executive Master of Management from BI Norwegian Business School		

Source: Company website

Board of directors

Name	Position	Shares	Options
Morten Foros Krohnstad	Chairman of the board		
	Krohnstad is a partner at Schjødt law firm, an experienced business lawyer, and serves on multiple boards of Norwegian companies.		
Trine Teigland	Director		
	Trine Teigland holds an MBA from the University of St. Gallen (HSG) and has managed sales and marketing activities for Swiss company Osmotex. She also has experience working in Singapore for a leading integrated shipping services provider, with a BA in International Business with Chinese.	24 691 829	
Lutz Heinemann	Director		
	Lutz Heinemann has a diverse academic background, with a specific emphasis on research and development in insulin pharmacology and diabetes technology. In 2009, he founded the Profil Institute for Metabolic Research in Neuss, Germany. Since 2011, he has held the role of Managing Editor for The Journal of Diabetes Science and Technology.		
Bo Petersson	Director		
	Bo Petersson holds a Ph.D. in Chemistry from The Technical University of Denmark and has accumulated over 20 years of experience in developing diabetes technology products. Recently, Ptersson served as the Head of Diabetes Care at Cambridge Consultants in Cambridge, UK. Presently, Petersson is also engaged as the Chief Scientific Officer at RSP Systems A/S in Copenhagen, Denmark.		
Hans Johan Hekland	Director		
	Hans Johan Hekland, a graduate of the Norwegian School of Management with a Master's degree in economics, has been serving as the Managing Partner at Sarsia Venture Management since 2001. With a broad range of expertise in fund management, strategy, business development, and finance, Hekland brings valuable insights to the table. Moreover, he has extensive experience in board positions and has been actively involved in various medical development companies as well as other listed and unlisted firms.	200 000	

Source: Company website

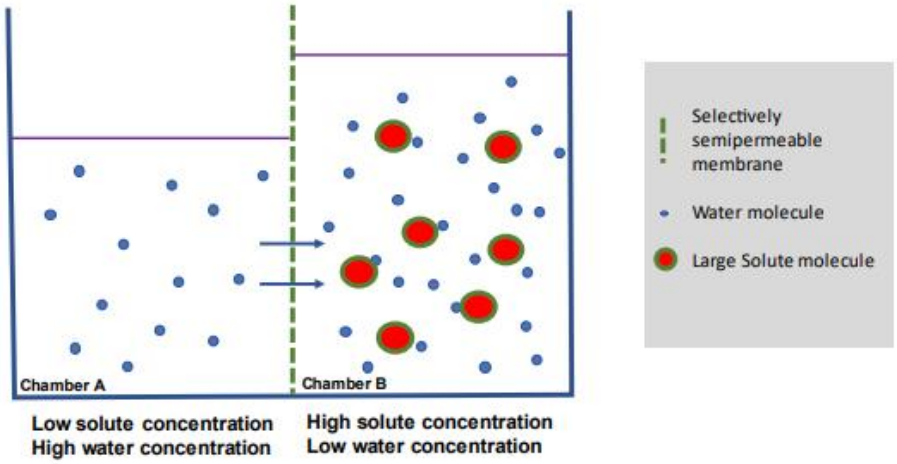
Osmotic pressure overview

Below, we provide a detailed overview of osmotic pressure and how it is used to measure blood glucose levels.

Osmosis is the process by which water or solvent moves from an area with a lower concentration of solute particles to an area with a higher concentration of solute particles through a semipermeable membrane until equilibrium is reached. If certain particles cannot pass through the membrane, the volume of the solution on the side with the initially higher concentration will increase until the particle concentrations are balanced on both sides.

Osmotic pressure refers to the pressure generated by the movement of water or solvent across a membrane as a result of osmosis. The greater the amount of liquid crossing the membrane, the higher the osmotic pressure.

Osmosis



Source: Company presentation

Osmotic pressure in the human body results from water being affected by different concentrations of dissolved molecules (solute), such as salts and nutrients. Cells in biological organisms use osmosis to maintain a constant intracellular volume and ensure the proper functioning of the cell membrane. Osmotic pressure plays a crucial role in fluid transport and balance within animal and plant cells.

The osmotic concentration (Cosm) represents the mass concentration of osmotically active particles in a solution. The size or type of particles does not impact osmotic pressure, as it is a physical phenomenon rather than a chemical one. The number of particles, including dissolved atoms, ions, sugars, proteins, or ethanol, determines osmolarity – the number of osmotically active particles per litre of solution or test material. In medical analysis, osm/L or osmol/L is the unit used for osmolarity, while lower concentrations may be denoted as osmol/l or mOsmol/l.

Each molecule contributes to osmotic activity, but when two osmotically active molecules combine to form one molecule, their osmotic value changes from 2 to 1. For instance, dextran is composed of multiple glucose molecules bound together. One dextran molecule exerts the same osmotic pressure as a single isolated glucose molecule, regardless of the number of glucose monomers the dextran consists of.

Osmotic pressure calculation

Osmotic pressure can be determined using the following formula:

$$\pi = i \cdot M \cdot R \cdot T$$

Where:
π = osmotic pressure
i = van't Hoff's factor
M = molar concentration of the particles in solution
R = ideal gas constant
T = Temperature in Kelvin (K)

i/van't Hoff's factor: a factor describing the amount of particles occurring when one molecule of the solid substance is dissolved in water, e.g. i = 1 for glucose or i = 2 for NaCl (as it dissociates into Na+ and Cl- in water)

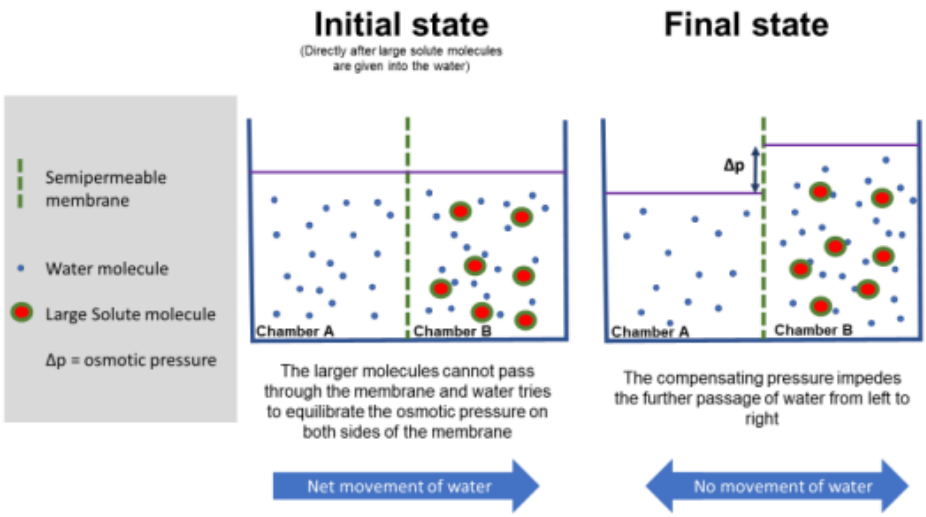
R/ideal gas constant = 0.08206 L x atm /mol x K

T = temperature in °C + 273.15 (30 °C = 303.15 K)

Source: Company presentation

Osmolarity can be determined by comparing the pressure difference between two chambers separated by a semipermeable membrane. In one chamber, there is a known reference solution, while the other chamber contains the solution under investigation. Since the particles cannot cross the membrane, the solvent will move into the chamber with higher concentration until the hydrostatic pressure reaches equilibrium with the osmotic pressure. The change in liquid level can be easily measured, as depicted in the diagram below.

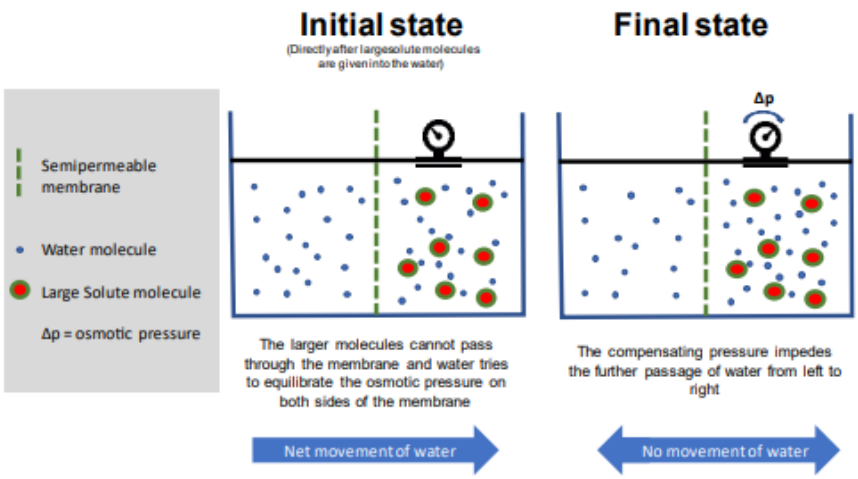
Osmotic pressure calculation



Source: Company presentation

In the case of a fully closed and sealed system, as shown in the diagram above, any alterations in osmotic pressure can only be identified by employing a pressure sensor. This is because the volume of liquid in chamber B is unable to expand any further. The diagram below provides a visual representation of this.

Visualization of osmotic pressure



Source: Company presentation

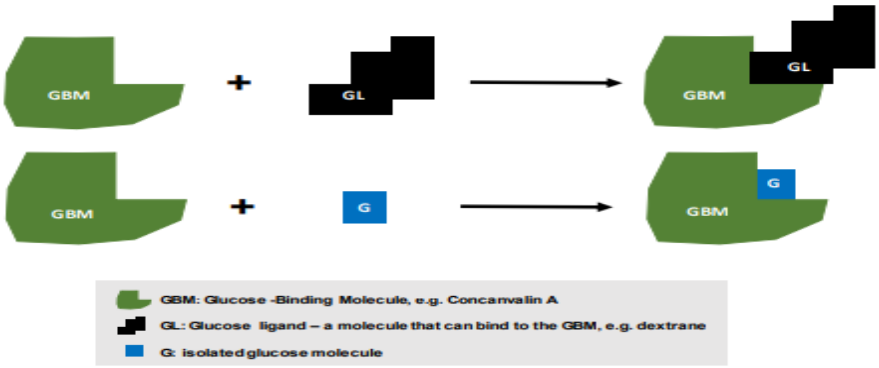
In a closed chamber system, if the number of osmotically active larger particles changes, it will cause a corresponding alteration in the osmotic pressure. This principle is employed to measure glucose levels using an osmotic pressure chamber.

How does Sencell measure glucose?

The glucose concentration in a sample, such as the interstitial fluid, can be determined by measuring the osmotic pressure of a sensitive liquid trapped by a semipermeable membrane in a closed chamber. The sensitive liquid undergoes changes in the number of osmotically active particles when glucose diffuses through the membrane into the chamber.

In the Sencell device, the sensitive liquid comprises two main components dissolved in an aqueous solution with a physiological pH inside the sensor chamber: Concanavalin A (GBM) and dextran (GL). Concanavalin A is a plant lectin with glucose binding sites, while dextran is a macromolecule made up of multiple glucose molecules. In a glucose-free solution, the GBM and GL form a complex due to the electrostatic binding of GL to the GBM at a glucose-specific binding site. When glucose is present, it can also bind to the GBM. These two potential affinity-binding reactions are illustrated in the diagram below.

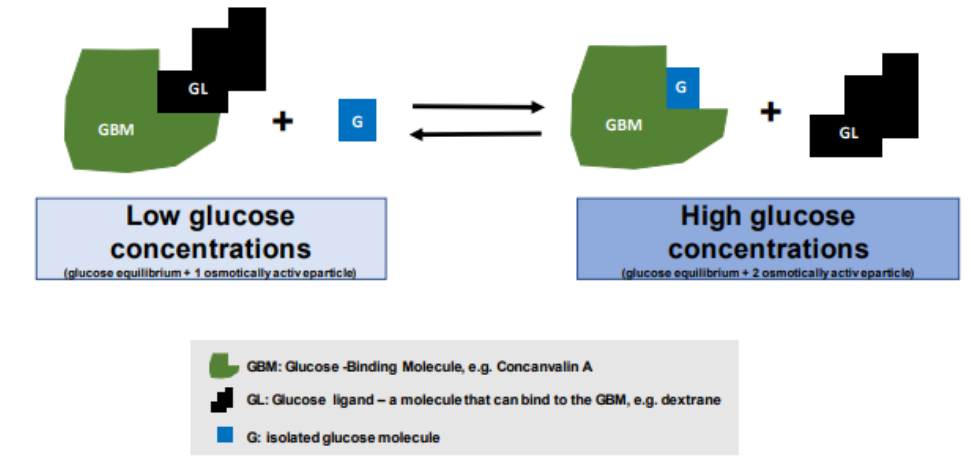
Possible affinity binding reactions in the sensitive liquid of Sencell



Source: Company presentation

The physicochemical properties of the electrostatic binding conditions play a role in determining the affinity of the GBM (Concanavalin A) for glucose compared to its affinity for the GL (dextran). The binding forces between GBM and glucose are slightly stronger than those between GBM and GL, although the difference is subtle. Consequently, the formation of GBM-glucose complexes is influenced by the glucose concentration in the liquid. When the glucose concentration is high, more GBM-GL complexes will dissociate and be replaced by GBM-glucose complexes. This can be understood as a competition between glucose and the GL for the binding site on the GBM. The extent of this competition primarily depends on the glucose concentration in the liquid, as depicted below.

Glucose concentration-dependent complex formation inside Sencell



Source: Company presentation

The formation of each GBM-glucose complex increases the number of osmotically active particles inside the sensor chamber. When the sensor is placed in the subcutaneous tissue, it creates a closed chamber system, where the surrounding tissue liquid represents chamber A, and the sensor chamber represents chamber B. As a result, the formation of GBM-glucose complexes, which depend on glucose concentration, increases the osmotic pressure within the sensor chamber.

By measuring the osmotic pressure using a suitable pressure transducer that converts it into an electronic signal, changes can be observed in the electronic sensor signal corresponding to an increase in the glucose concentration in the interstitial fluid. It's worth noting that the affinity-binding reactions between the molecules are entirely reversible, and none of the chemical molecules involved are altered or destroyed during these reactions. This scientific principle forms the basis for the potential long-term use of sensors utilizing this technology.

Mode of operation of the Sencell device

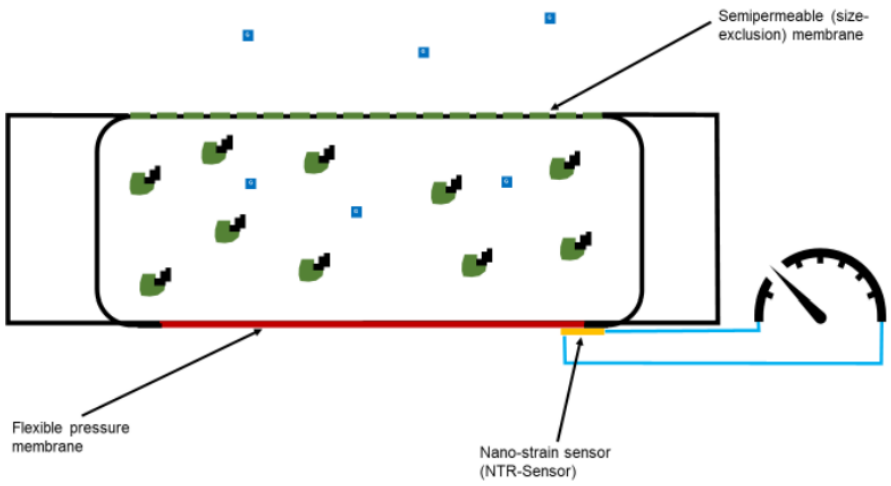
The competition between glucose and another molecule for binding to a receptor molecule influences the osmotic pressure inside the chamber. The Sencell sensor, which is very small and sensitive, consists of a nanoscale pressure sensor made using 3D printing technology (Nano3DSense). This sensor measures the osmotic pressure and is placed inside a chamber closed on one side by a semipermeable membrane. The membrane holds a special fluid sensitive to changes in osmotic pressure.

The sensor is positioned at the base of a second membrane, which moves when the osmotic pressure in the chamber increases or decreases. On the other side of the chamber, there is a ceramic membrane with tiny pores that only allow molecules with a diameter smaller than 5 nanometres to pass through. The GBM and the GL molecules are much larger and cannot pass

through these pores. However, glucose and water molecules can freely move between the compartments through the pores.

Below, we show a diagram of the glucose sensor setup to offer a visual representation.

Glucose concentration-dependent complex formation inside Sencell



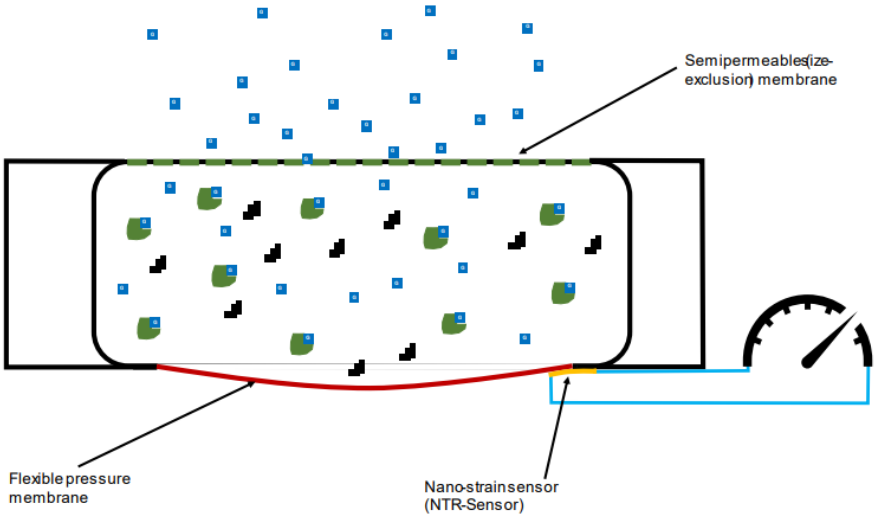
Source: Company presentation

When there is an increase in the concentration of glucose in the interstitial fluid, glucose molecules will pass through a special membrane into a chamber called the osmotic pressure chamber. This happens because the glucose wants to balance the concentration difference between the inside and outside of the chamber. As more glucose molecules enter the chamber, they compete with dextran for binding sites on the GBM molecule.

Eventually, the dextran molecules are pushed out of the complexes, and the glucose molecules take their place. This process increases the number of osmotically active particles inside the chamber. These particles cannot pass through the membrane. As a result, water molecules from the surrounding fluid enter the chamber in an attempt to balance out the concentration difference of the osmotically active particles. This causes the osmotic pressure inside the chamber to increase.

The increase in osmotic pressure causes a membrane to move, and a nano-sensor is located at the base of this membrane. The nano-sensor spans both the fixed and movable parts of the membrane. When the membrane moves due to changes in pressure, it generates an electronic signal that can be captured and measured using electronic equipment. The diagram below illustrates the state of the glucose sensor setup.

Glucose concentration-dependent complex formation inside Sencell



Source: Company presentation

The Sencell device has two essential features: osmotic pressure sensing technology; and nano-sensing technology. The osmotic pressure-sensing technology allows the device to measure glucose concentrations by observing the competition between glucose and GL for the GBM binding site. This competition is reversible, meaning glucose and GL can bind and unbind from the GBM molecule. The nano-sensing technology enables the device to be small and compact.

In tests conducted ahead of human trials, the Sencell osmotic pressure sensor has been shown to be sensitive enough to detect glucose concentrations in tissues. It also produces a signal response directly proportional to the pressure changes, which is essential for accurate glucose measurements. These promising results demonstrate the potential effectiveness of the Sencell device in measuring glucose levels.

Patents

Lifecare's Sencell technology is protected in the form of three active patents, including the membrane (valid until 2024), extended osmotic pressure (valid until 2030), and the measurement with a sensor based on two chambers with a pressure sensor (valid until 2038). Additionally, Lifecare has active patent applications to obtain patent protection for the biochemical composition used to identify changes in glucose levels.

Overview of patents

Title	Country	Application Type	Status	Case Status	National Application Date	Application Number	Registration Date	Registration Number	Renewal Date	Owner(s)	Zacco Reference	Case Type
Apparatus and method for measuring augmented osmotic pressure in a reference cavity	Belgium	Validated after EPC	Registered	Registered	2018-10-04	08793907.0	2018-07-11	2185910	2023-08-31	LIFECARE AS	P291652BEEP	Patent
Apparatus and method for measuring augmented osmotic pressure in a reference cavity	Poland	Validated after EPC	Registered	Registered	2018-10-08	08793907.0	2018-07-11	2185910	2023-08-20	LIFECARE AS	P291652PLEP	Patent
Apparatus and method for measuring augmented osmotic pressure in a reference cavity	Hungary	Validated after EPC	Registered	Registered	2018-09-27	08793907.0	2018-07-11	2185910	2023-08-20	LIFECARE AS	P291652HUEP	Patent
Apparatus and method for measuring augmented osmotic pressure in a reference cavity	Germany	Validated after EPC	Registered	Registered	2018-09-14	08793907.0	2018-07-11	2185910	2023-08-31	LIFECARE AS	P291652DEEP	Patent
Apparatus and method for measuring augmented osmotic pressure in a reference cavity	Netherlands	Validated after EPC	Registered	Registered	2018-10-04	08793907.0	2018-07-11	2185910	2023-08-31	LIFECARE AS	P291652NLEP	Patent
Apparatus and method for measuring augmented osmotic pressure in a reference cavity	Sweden	Validated after EPC	Registered	Registered	2018-09-28	08793907.0	2018-07-11	2185910	2024-08-31	LIFECARE AS	P291652SEEP	Patent
Apparatus and method for measuring augmented osmotic pressure in a reference cavity	Spain	Validated after EPC	Registered	Registered	2018-10-03	08793907.0	2018-07-11	2185910	2023-11-30	LIFECARE AS	P291652ESEP	Patent
Apparatus and method for measuring augmented osmotic pressure in a reference cavity	United Kingdom	Validated after EPC	Registered	Registered	2018-10-08	08793907.0	2018-07-11	2185910	2023-08-31	LIFECARE AS	P291652GBEP	Patent
Apparatus and method for measuring augmented osmotic pressure in a reference cavity	United States	PCT Based with Priority	Registered	Registered	2010-02-16	12/733,258	2013-09-24	8,539,822	2025-03-24	LIFECARE AS	P291652US00	Patent
Apparatus and method for measuring augmented osmotic pressure in a reference cavity	Switzerland	Validated after EPC	Registered	Registered	2018-09-21	08793907.0	2018-07-11	2185910	2023-08-31	LIFECARE AS	P291652CHEP	Patent
Apparatus and method for measuring augmented osmotic pressure in a reference cavity	France	Validated after EPC	Registered	Registered	2018-09-24	08793907.0	2018-07-11	2185910	2023-08-31	LIFECARE AS	P291652FREP	Patent
Apparatus and method for measuring augmented osmotic pressure in a reference cavity	Denmark	Validated after EPC	Registered	Registered	2018-10-04	08793907.0	2018-07-11	2185910	2023-08-31	LIFECARE AS	P291652DKEP	Patent
Apparatus and method for measuring augmented osmotic pressure in a reference cavity	Portugal	Validated after EPC	Registered	Registered	2018-10-03	08793907.0	2018-07-11	2185910	2023-08-20	LIFECARE AS	P291652PTEP	Patent
Apparatus and method for measuring augmented osmotic pressure in a reference cavity	Czechia	Validated after EPC	Registered	Registered	2018-10-05	08793907.0	2018-07-11	2185910	2023-08-20	LIFECARE AS	P291652CZEP	Patent
Apparatus and method for measuring augmented osmotic pressure in a reference cavity	Italy	Validated after EPC	Registered	Registered	2018-10-05	08793907.0	2018-07-11	2185910	2023-08-31	LIFECARE AS	P291652ITEP	Patent
Fluid composition, method for preparing the composition and use	EPC	PCT Based with Priority	Pending	Examination	2019-10-14	18714623.8			2024-03-31	LIFECARE AS	P341579EP00	Patent
Fluid composition, method for preparing the composition and use	United States	PCT Based with Priority	Pending	Examination	2019-09-13	16/494191				LIFECARE AS	P341579US00	Patent
Fluid composition, method for preparing the composition and use	Norway	Priority Founding	Registered	Registered		20170385	2019-01-28	343313	2024-03-31	LIFECARE AS	P341579NO01	Patent
Interstitial Fluid Osmotic Pressure Measuring Device System and Method	Denmark	Validated after EPC	Registered	Registered	2021-10-20	18813314.4	2021-07-28	3634214	2023-06-30	LIFECARE AS	P341772DKEP	Patent
Interstitial Fluid Osmotic Pressure Measuring Device System and Method	United States	PCT Based with Priority	Pending	Examination	2019-12-05	16/619,731				LIFECARE AS	P341772US00	Patent
Interstitial Fluid Osmotic Pressure Measuring Device System and Method	United Kingdom	Validated after EPC	Registered	Registered	2021-10-19	18813314.4	2021-07-28	3634214	2023-06-30	LIFECARE AS	P341772GBEP	Patent
Interstitial Fluid Osmotic Pressure Measuring Device System and Method	Sweden	Validated after EPC	Registered	Registered	2021-10-26	18813314.4	2021-07-28	3634214	2024-06-30	LIFECARE AS	P341772SEEP	Patent
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Interstitial Fluid Osmotic Pressure Measuring Device System and Method	Italy	Validated after EPC	Registered	Registered	2021-10-27	18813314.4	2021-07-28	3634214	2023-06-30	LIFECARE AS	P341772ITEP	Patent
Interstitial Fluid Osmotic Pressure Measuring Device System and Method	Germany	Validated after EPC	Registered	Registered	2021-10-26	18813314.4	2021-07-28	3634214	2023-06-30	LIFECARE AS	P341772DEEP	Patent
Interstitial Fluid Osmotic Pressure Measuring Device System and Method	Belgium	Validated after EPC	Registered	Registered	2021-10-26	18813314.4	2021-07-28	3634214	2023-06-30	LIFECARE AS	P341772BEEP	Patent
Interstitial Fluid Osmotic Pressure Measuring Device System and Method	Netherlands	Validated after EPC	Registered	Registered	2021-10-25	18813314.4	2021-07-28	3634214	2023-06-30	LIFECARE AS	P341772NLEP	Patent
Interstitial Fluid Osmotic Pressure Measuring Device System and Method	Norway	Validated after EPC	Registered	Registered	2021-10-20	18813314.4	2021-07-28	3634214	2023-06-30	LIFECARE AS	P341772NOEP	Patent
Interstitial Fluid Osmotic Pressure Measuring Device System and Method	Switzerland	Validated after EPC	Registered	Registered	2021-10-19	18813314.4	2021-07-28	3634214	2023-06-30	LIFECARE AS	P341772CHEP	Patent
Interstitial Fluid Osmotic Pressure Measuring Device System and Method	France	Validated after EPC	Registered	Registered	2021-10-18	18813314.4	2021-07-28	3634214	2023-06-30	LIFECARE AS	P341772FREP	Patent
Sensor for in-vivo målinger av osmotiske forandringer -	India	PCT Based with Priority	Registered	Registered	2005-11-30	2437/KOLNP/2005	2009-06-10	234591	2023-06-09	LIFECARE AS	P340102IN00	Patent
Sensor for in-vivo målinger av osmotiske forandringer -	China	PCT Based with Priority	Registered	Registered	2006-01-28	200480022586.6	2009-04-08	ZL200480022586.6	2023-06-09	LIFECARE AS	P340105CN00	Patent
Sensor for in-vivo målinger av osmotiske forandringer.	United Kingdom	Validated after EPC	Registered	Registered	2008-06-26	04748746.7	2008-04-09	1631187	2023-06-30	LIFECARE AS	P340099GBEP	Patent
Sensor for in-vivo målinger av osmotiske forandringer.	Norway	Priority Founding	Registered	Registered		20032608	2004-12-27	317911	2021-06-30	LIFECARE AS	P336224NO00	Patent
Sensor for in-vivo målinger av osmotiske forandringer.	Spain	Validated after EPC	Registered	Registered	2008-07-02	04748746.7	2008-04-09	1631187	2023-09-30	LIFECARE AS	P340099ESEP	Patent
Sensor for in-vivo målinger av osmotiske forandringer.	Switzerland	Validated after EPC	Registered	Registered	2008-06-18	04748746.7	2008-04-09	1631187	2023-06-30	LIFECARE AS	P340099CHEP	Patent
Sensor for in-vivo målinger av osmotiske forandringer.	France	Validated after EPC	Registered	Registered	2008-07-03	04748746.7	2008-04-09	1631187	2023-06-30	LIFECARE AS	P340099FREP	Patent
Sensor for in-vivo målinger av osmotiske forandringer.	Belgium	Validated after EPC	Registered	Registered	2008-07-09	04748746.7	2008-04-09	1631187	2023-06-30	LIFECARE AS	P340099BEEP	Patent
Sensor for in-vivo målinger av osmotiske forandringer.	United States	PCT Based with Priority	Registered	Registered	2005-12-01	10/559323	2007-10-02	7276028		LIFECARE AS	P340100US00	Patent
Sensor for in-vivo målinger av osmotiske forandringer.	Germany	Validated after EPC	Registered	Registered		04748746.7	2008-04-09	1631187	2023-06-30	LIFECARE AS	P340099DEEP	Patent
Sensor for in-vivo målinger av osmotiske forandringer.	Denmark	Validated after EPC	Registered	Registered	2008-07-04	04748746.7	2008-04-09	1631187	2023-06-30	LIFECARE AS	P340099DKEP	Patent
Sensor in vivo measurement of osmotic changes	Canada	PCT Based with Priority	Registered	Registered	2005-11-30	2527251	2010-03-30	2,527,251	2023-06-09	LIFECARE AS	P340101CA00	Patent
Sensor in vivo measurement of osmotic changes	Japan	PCT Based with Priority	Registered	Registered	2005-12-08	2006-516997	2009-10-30	4399455	2023-10-30	LIFECARE AS	P340103JP00	Patent

Source: Company data

CGM competitors

Abbott Laboratories

Abbott was the leading supplier of blood glucose monitoring devices in 2021, with a market share of 38.3% and sales of USD4.3bn. The company offers both CGMs and BGMs, which has helped it maintain its substantial market share. Abbott is the leading supplier of CGMs and the third-largest supplier of BGMs. However, the company will face increasingly stiff competition in the future.

The FreeStyle Libre 3 is Abbott's newest CGM, and it is the smallest non-inserted sensor on the market, with a battery life of 14 days. The device is suitable for type 1 and type 2 diabetics and people with gestational diabetes, making it widely available. Abbott's collaboration with insulin pump manufacturers has also contributed to strong market uptake.

The FreeStyle Libre product line includes the first-generation FreeStyle Libre, FreeStyle Libre 2, and FreeStyle Libre 3. The Libre 2 has a similar appearance to the first-generation device, but it is suitable for patients aged four years and older and has an optional alarm system. The Libre 2 can be integrated with non-pump-based insulin delivery systems and is compatible with Insulet's Omnipod 5 insulin pump system. The FreeStyle Libre 3, approved by the FDA in May 2022, is smaller, lighter, and more accurate than previous models.

Abbott is collaborating with CamDiab and Ypsomed to enhance the FreeStyle Libre 3 CGM technology with advanced software. The goal is to integrate the device with Ypsomed's Ypsopump and CamDiab's CamAPS Fx to autonomously compute and direct insulin delivery for tight glycemic control.

Freestyle Libre 3

Source: Company website

Dexcom

Dexcom is a leading global pioneer of CGM technology, accounting for c22% of the global blood glucose monitoring devices market, and with sales of USD2.9bn in 2022. The company focuses entirely on CGM technology, with the Dexcom G6 being the first CGM to be approved by the FDA as a part of a hybrid closed-loop system. Dexcom has partnered with medical device manufacturers to design interoperable systems, giving it an advantage as many consumers value the flexibility to choose from various insulin pumps.

In October 2022, Dexcom launched the next-generation G7 in the EU, the UK, and Hong Kong, with additional launches expected in other regions during 2023. The G7 is 40% smaller than its predecessor, with a faster warm-up time and a simplified design. According to Dexcom's 2021 annual report, the company's competitive strategy is two-pronged. It intends to leverage development expertise to bring new products to market and to expand indications. Dexcom also emphasises driving its products' adoption via key technology integration partnerships.

Dexcom's flagship product is the Dexcom G6, which consists of a disposable sensor and a reusable transmitter. The device can be used with a purpose-built control unit or a smartphone with the Dexcom ONE app installed. The app operates continuously, providing real-time updates, and can share data with up to 10 different individuals. The device requires a two-hour warmup period upon application to establish baseline readings.

The Dexcom G6 was designed to integrate with insulin pumps as part of a hybrid closed-loop system. Its interoperability enables it to work with any third-party insulin pump with an appropriate digital interface. Dexcom collaborates with Tandem Diabetes Care and Insulet in the US and with ViCentra and Ypsomed in Europe to integrate with their insulin pumps.

Dexcom recently announced the global rollout of the Dexcom G7, which is smaller than its predecessor and has a faster warm-up time. The device has a MARD of 8.2% compared with 9.0% for the Dexcom G6 and 9.3% for Abbott's Freestyle Libre 2. The Dexcom G7 is available for diabetic patients aged two years and older in the EU and the UK, and its US launch is anticipated during 2023.

Dexcom G7

Source: Company website

Medtronic

Leading medical device manufacturer Medtronic has captured a relatively small share (3.3%) of the global blood glucose monitoring devices market, with associated sales of approximately USD376.3m. The company has focused entirely on CGM devices and has elected to create CGMs only compatible with its MiniMed insulin pumps.

Medtronic's diabetes business reported revenues of USD2.3bn for 2022, a 3.1% decline from the previous fiscal year. Factors contributing to this included a nearly 8% loss of market share in the US due to a lack of Medicare coverage. The MiniMed 780G insulin pump, required to operate the Guardian 4 CGM, remains under FDA review.

Medtronic is the market's sole company offering a CGM and insulin pump system – this is known as the MiniMed line. The company provides two CGMs: the Guardian Connect CGM and the Guardian Sensor 3 CGM, intended for use with the MiniMed pumps. Both CGMs consist of a seven-day sensor and a transmitter.

The Guardian Connect is a CGM compatible with smartphones that does not require a separate handheld receiver or insulin pump system to view glucose data. It passively updates the user, eliminating the need for a dedicated control unit or manual sensor scanning. The Connect also features a predictive algorithm that provides alerts regarding potential high or low-glucose events up to 60 minutes in advance, allowing patients to take corrective action. Glucose readings are measured and recorded every five minutes, which equates to 288 readings per day, helping users avoid nighttime hypoglycaemia. The Guardian Connect interfaces with Medtronic's CareLink software to allow interaction with healthcare professionals and to share data and text alerts with caregivers. However, it is not designed to act in conjunction with an insulin pump system.

To address the issue of insulin pump connectivity, Medtronic released the Guardian Sensor 3 CGM, which can interface directly with the MiniMed line of insulin pumps. The Guardian Sensor 3 is not designed to operate with third-party systems. This singular compatibility with the MiniMed pumps allows for streamlined production of a purpose-built system. Still, patients using the Guardian Sensor 3 have less flexibility in choosing accessories for their CGMs.

Recently, changes made in the 2022 Medicare policy will cover the Guardian Sensor 3 and the upcoming Guardian 4, but Guardian Connect will still not receive coverage due to the language in the new policy restricting smartphone use.

Medtronic announced long-term clinical trial results for its latest CGM, the Guardian 4. It demonstrated a higher effectiveness (8.7% MARD) than its predecessor and is designed to operate with the latest insulin pump released by Medtronic, the MiniMed 780G.

Medtronic Guardian 4

Source: Company website

Senseonics

Senseonics specialises in developing implantable CGM technology, its primary product being the Eversense E3, which was launched in the US in H1 2022. The Eversense E3 is the only implantable device currently available in the market with an innovative design offering a six-month lifespan. Although Senseonics only controls 0.1% of the blood glucose monitoring devices market, the Eversense E3 is noteworthy because its standalone device design provides blood glucose readings and sound alarms before hypo- or hyperglycaemic events.

Sales of Senseonics' blood glucose monitoring devices totalled USD13.7m in 2021, representing a 179.6% increase from the previous fiscal year's sales of USD4.9m. The company reports sales in a single business segment; approximately 81% of sales occur outside the US. While Senseonics designs and manufactures its products, Ascensia Diabetes Care markets and sells the Eversense E3.

The Eversense E3 is approved for patients aged 18 and above, its implantable sensor and external transponder having a lifespan of six months. The implantation process is a quick 10-minute outpatient procedure, and the transmitter must be held close to the implant site with an adhesive pad or strap to obtain a reading. The device's algorithm predicts glycaemic events 30 minutes in advance, and the transmitter vibrates at different frequencies to indicate low or high glucose levels. The Eversense E3 helps patients with severe T1D who require multiple glucose tests daily, reducing finger pricks to two calibrations for the first 21 days of wear, and one finger prick daily after that.

However, the Eversense E3 is a standalone device and cannot integrate with other devices like insulin pumps, limiting its competitiveness compared to other products like the Dexcom G6. The device also requires two daily calibrations via test strip readings and needs to be implanted twice a year. Additionally, the Eversense E3 does not have a dedicated control unit and relies entirely on smartphone-based apps to operate.

Eversense E3

Source: Company website

Summary Redeye Rating

The rating consists of three valuation keys, each constituting an overall assessment of several factors rated on a scale of 0 to 1 points. The maximum score for a valuation key is 5 points.

Rating changes in the report: No rating changes in this report

People: 3
Lifecare has ~25 employees, and its management and board of directors provide the company with experience in relevant areas, including R&D, finance, law, and management.

The CEO, Joacim Holter, holds an LL.M from the University of Bergen in Norway. He has spent over 15 years in various management roles, including six years leading international R&D and product development in Switzerland. He also has been with the company for a long time, serving as both chairman and board member of Lifecare's board from 2011-2020. The board of directors is led by Morten Foros Krohnstad, a partner in the law firm Schjødt with extensive experience as a board professional in Norwegian listed and unlisted companies.

Business: 3
Lifecare is an innovative medtech company that aims to capture a portion of the USD>6bn continuous glucose monitoring (CGM) market growing c15% annually through its differentiated sensor under-the-skin sensor Sencell. Moreover, CGMs are used by diabetes patients to monitor their glucose levels to assert insulin injections, creating recurring and predictable revenue streams. Although it will take a few more years for Lifecare to complete its development and clinical validation before entering the market, Sencell offers a strong value proposition for diabetes patients, leading to a significant commercial opportunity.

If Sanofi, which holds a right of first refusal on Sencell, decides to utilize it, Lifecare has the potential to establish itself as a disruptive niche player in this immense market.

Financials: 0
We believe that Lifecare has the potential to become a very profitable company on the back of Sencell's value proposition towards T1D and T2D patients. We see potential for gross margins in the 50% range and EBIT margins in the twenties once the company becomes profitable, which we estimate in 2026. However, until then, the company is equity funded, and we assess that equity raise is required to take the company to breakeven.

	2021	2022	2023e	2024e
INCOME STATEMENT				
Net sales	0	0	0	0
Other income	2	22	0	0
Gross Profit	2	22	8	9
Operating Expenses	17	37	50	68
EBITDA	-15	-15	-42	-59
Depreciation & Amortization	1	3	4	4
EBIT	-16	-17	-46	-63
Net Financial Items	0	0	0	0
EBT	-16	-17	-46	-63
Income Tax Expenses	0	1	0	0
Non-Controlling Interest	0	0	0	0
Net Income	-16	-17	-46	-63
BALANCE SHEET				
Assets				
Current assets				
Cash & Equivalents	21	48	79	102
Inventories	0	0	1	2
Accounts Receivable	0	1	2	2
Other Current Assets	2	6	6	6
Total Current Assets	23	55	88	112
Non-current assets				
Property, Plant & Equipment, Net	0	3	6	18
Goodwill	2	6	6	6
Intangible Assets	7	6	5	3
Right-of-Use Assets	0	0	0	0
Shares in Associates	0	0	0	0
Other Long-Term Assets	0	0	0	0
Total Non-Current Assets	9	15	17	27
Total Assets	32	70	104	139
Liabilities				
Current liabilities				
Short-Term Debt	0	0	0	0
Short-Term Lease Liabilities	0	0	0	0
Accounts Payable	2	2	4	6
Other Current Liabilities	2	7	9	10
Total Current Liabilities	4	9	13	16
Non-current liabilities				
Long-Term Debt	0	0	0	0
Long-Term Lease Liabilities	0	0	0	0
Other Long-Term Liabilities	4	6	6	6
Total Non-current Liabilities	4	6	6	6
Non-Controlling Interest	0	0	0	0
Shareholder's Equity	24	55	86	117
Total Liabilities & Equity	32	70	104	139
CASH FLOW				
NOPAT	-16	-18	-46	-63
Change in Working Capital	3	1	2	2
Operating Cash Flow	-14	-18	-40	-57
Capital Expenditures	-7	-3	-5	-15
Investment in Intangible Assets	0	0	0	0
Investing Cash Flow	-7	-9	-5	-15
Financing Cash Flow	30	54	76	95
Free Cash Flow	-21	-21	-45	-72

DCF Valuation Metrics 2023e-2037e	**Sum FCF (SEKm)**
2023e-2025e	-73
2026e-2031e	255
Terminal value	491
Net cash (capital raises)	208
Equity Value	881
Fair Value per Share	3,5

SHAREHOLDER STRUCTURE	**CAPITAL %**	**VOTES %**
Teigland Eiendom AS	21%	21%
Lacal AS	15%	15%
Vpf Nordea Avkastning	8%	8%
Spit Air AS	3%	3%
Westhawk AS	3%	3%

SHARE INFORMATION	
Reuters code	LIFE
List	Euronext Growth Oslo
Share price	1,9
Total shares, million	117,9
Total shares, million (diluted)	253,2

MANAGEMENT & BOARD	
CEO	Joacim Holter
Chairman	Morten Foros Krohnstad

ANALYSTS
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Redeye Rating and Background Definitions

Company Quality

Company Quality is based on a set of quality checks across three categories; PEOPLE, BUSINESS, FINANCE. These are the building blocks that enable a company to deliver sustained operational outperformance and attractive long-term earnings growth.

Each category is grouped into multiple sub-categories assessed by five checks. These are based on widely accepted and tested investment criteria and used by demonstrably successful investors and investment firms. Each sub-category may also include a complementary check that provides additional information to assist with investment decision-making.

If a check is successful, it is assigned a score of one point; the total successful checks are added to give a score for each sub-category. The overall score for a category is the average of all sub-category scores, based on a scale that ranges from 0 to 5 rounded up to the nearest whole number. The overall score for each category is then used to generate the size of the bar in the Company Quality graphic.

People

At the end of the day, people drive profits. Not numbers. Understanding the motivations of people behind a business is a significant part of understanding the long-term drive of the company. It all comes down to doing business with people you trust, or at least avoiding dealing with people of questionable character.

The People rating is based on quantitative scores in seven categories:

- Passion, Execution, Capital Allocation, Communication, Compensation, Ownership, and Board.

Business

If you don't understand the competitive environment and don't have a clear sense of how the business will engage customers, create value and consistently deliver that value at a profit, you won't succeed as an investor. Knowing the business model inside out will provide you some level of certainty and reduce the risk when you buy a stock.

The Business rating is based on quantitative scores grouped into five sub-categories:

- Business Scalability, Market Structure, Value Proposition, Economic Moat, and Operational Risks.

Financials

Investing is part art, part science. Financial ratios make up most of the science. Ratios are used to evaluate the financial soundness of a business. Also, these ratios are key factors that will impact a company's financial performance and valuation. However, you only need a few to determine whether a company is financially strong or weak.

The Financial rating is based on quantitative scores that are grouped into five separate categories:

- Earnings Power, Profit Margin, Growth Rate, Financial Health, and Earnings Quality.

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Disclaimer

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Redeye does not issue any investment recommendations for fundamental analysis. However, Redeye has developed a proprietary analysis and rating model, Redeye Rating, in which each company is analyzed and evaluated. This analysis aims to provide an independent assessment of the company in question, its opportunities, risks, etc. The purpose is to provide an objective and professional set of data for owners and investors to use in their decision-making.

Redeye Rating (2023-06-28)

Rating	People	Business	Financials
5p	32	15	4
3p - 4p	142	128	43
0p - 2p	5	36	132
Company N	179	179	179

Duplication and distribution

CONFLICT OF INTERESTS

Filip Einarsson owns shares in the company : No
Gustaf Meyer owns shares in the company : No
Redeye performs/have performed services for the Company and receives/have received compensation from the Company in connection with this.