# BIOCORP

PEA SME

**BUY**

Life Sciences

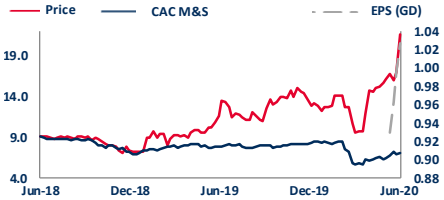
GILBERT DUPONT

GROUPE SOCIETE GENERALE

| PRICE* | TP | POTENTIAL |
|---|---|---|
| € 21.60 | € 26.9 | +24.7% |
| *closing 19/06/20 | | |

## Initiation + Contact

| | |
|---|---|
| Bloomberg | ALCOR FP |
| Market cap. | €m 90 |
| Free Float | €m 46 |
| Volume (3M) | €m 0.13/day |




| PERFORMANCE | 1M | 6M | 12M |
|---|---|---|---|
| Absolute | +33.3% | +64.9% | +74.2% |
| Rel. / CAC M&S | +21.3% | +94.0% | +97.7% |

**AGENDA**

**24/09/2020 : H1 NR**

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# Growth to be driven by compliance

We are initiating coverage of Biocorp, a company that since 2015 has been developing connected devices for healthcare. It has shifted its focus to this segment and notably introduced a system for optimising treatment of diabetic patients in partnership with Sanofi.

### Successful shift from family business to connected device specialist

Founded in 2004, Biocorp started out manufacturing and then developing and designing products for dosing and delivering injectable drugs. It shifted its focus to digital in 2015 and has since acquired recognised expertise in connected devices. This evolution of the company's core business led to a change in governance and a contract with Sanofi. Jacques Gardette, Biocorp's founder, was replaced as CEO by Eric Dessertenne, who previously occupied the strategic position of head of BD&L.

### Using AI to improve compliance with diabetes treatments…

Biocorp's positioning is backed by a strong rationale and, most importantly, its solutions constitute a real asset within the diabetes treatment ecosystem. The connected device it developed is used with insulin injection pens to measure the exact amount of insulin to be injected. Reliable data is sent immediately to treating physicians. The goals are to assist patients in taking their medication and provide doctors with accurate and analysable data, thus improving both care and compliance.

### … to better control the risk of comorbid diseases…

Improving disease monitoring will automatically boost the efficacy of treatments as compliance will increase and it will be easier for doctors to make necessary adjustments. Over time, this should reduce the risk of complications and comorbid diseases. This is a key concern with diabetes patients, as comorbid conditions tend to worsen overall health. In sum, the healthcare system must do all it can to improve compliance, yet there is still not enough focus on this aspect of care, despite all that is at stake.

### … and to optimise related costs!

Better compliance can sharply reduce healthcare costs resulting from diabetes complications. This is precisely the area Biocorp plans to address by making its products available to the leading pharma companies. It reached a first non-exclusive deal with Sanofi in December 2019 to use its technology with the SoloStar insulin pen. Biocorp intends to forge similar partnerships with other firms in the near future.

### Buy, TP of €26.9 (DCF)

We are initiating coverage of Biocorp with a TP of €26.9 and a Buy rating, reflecting the landmark deal with Sanofi, which we believe is only the first of its kind. We are confident that Biocorp's technology will appeal to other companies as well.

| STOCK RATIOS | 12/19 | 12/20e | 12/21e | 12/22e |
|---|---|---|---|---|
| P/E | 55.7x | 11.2x | 6.0x | 4.2x |
| PEG | ns | 0.0x | 0.1x | 0.1x |
| P/CF | 54.6x | 11.1x | 5.9x | 4.2x |
| EV/Sales | | | | |
| EV/EBITDA | | | | |
| EV/C. EBIT | | | | |
| EV/EBIT | | | | |
| EV/Capital employed | | | | |
| P/BV | 1562.3x | 109.5x | 14.4x | 8.3x |
| FCF yield | -4.0% | 5.9% | 11.7% | 15.4% |
| Yield | 0.0% | 0.0% | 0.0% | 0.0% |

| FINANCIAL DATA | 12/19 | 12/20e | 12/21e | 12/22e |
|---|---|---|---|---|
| Sales (€m) | 8.6 | 20.2 | 33.3 | 48.8 |
| C. EBIT (€m) | 0.9 | 10.4 | 20.6 | 31.6 |
| C. EBIT/Sales | 10.1% | 51.6% | 61.9% | 64.7% |
| EBIT (€m) | 0.9 | 10.4 | 20.6 | 31.6 |
| Net attributable profit (€m) | 1.0 | 8.0 | 15.1 | 21.4 |
| Adjusted EPS (€) | 0.23 | 1.94 | 3.63 | 5.17 |
| Chg. | ns | 736.5% | 87.5% | 42.4% |
| FCF (€m) | -1.8 | 5.3 | 10.5 | 13.8 |
| Net fin. debt (€m) | 3.6 | -5.0 | -18.8 | -40.9 |
| Gearing | 10577.1% | -617.0% | -301.9% | -378.4% |
| ROCE | 16.8% | -172.3% | -114.8% | -73.4% |

## 60 SECONDS TO CONVINCE

### Investment case

Biocorp has adapted its business model in a way that makes the most of its traditional expertise, while innovating to keep up with the times. In recent years, it has successfully shifted its focus to e-health and is now a specialist in artificial intelligence for healthcare. We find the company's new business model particularly smart since it aims to bolster the positions of leaders that are already solidly anchored in specific franchises. This strategy has so far yielded a first partnership with Sanofi under the terms of which diabetics taking insulin via Sanofi's SoloStar insulin pen will use Biocorp's connected device to get real-time readings on several parameters critical to diabetic care and treatment. Through this deal, the partners hope to win market share in a segment with no real competition. The fact is that with chronic diseases like diabetes, compliance is very often low. It is precisely this "overlooked" market that Biocorp and Sanofi are seeking to capture. Beyond the obvious benefits both for patients and treating physicians of a potentially significant improvement in care and reduction in compliance or reporting problems, the medical and economic benefits can be substantial. Indeed, the data gathered could be extremely valuable to pharma companies as well as insurers and payers, giving them concrete ways to optimise care across the entire patient pathway, both medically and financially. Over the longer term, datamining of the data collected could allow greater insight into patient profiles: best responders, at-risk profiles, medicine-taking behaviours, etc. This in turn should help identify inflection points in overall medical care.

### Biocorp at the junction of medical devices and datamining

Biocorp has crafted a new identity for itself, building on its traditional know-how to acquire expertise in software for embedded systems. By combining these two activities, Biocorp has positioned itself as a pioneer in connected medical devices for the pharmaceutical industry.


### Key findings

In this report, we focus on Biocorp's new identity. Originally a family-owned company that made containers for the pharmaceutical industry, it saw an opportunity to grow by building on its traditional expertise. With its new positioning, the company has stepped into the digital era in an innovative enough way to stand out among e-health firms. We feel certain that it will increasingly shift its focus more toward e-health and establish itself solidly as a developer of connected medical devices. Its traditional activity should become secondary, albeit while providing Biocorp with a secure source of recurring revenue (currently €2-3m a year).

As we see it, this dual profile, though heavily weighted toward the "connected" businesses, gives Biocorp a very attractive risk/reward profile, especially at a time when 1/ it has secured a deal with Sanofi that should guarantee income streams over the coming years, 2/ the share price is relatively low, and 3/ the business mix includes a core business that will ensure the longevity of the different activities and of the company.

### What price for what long-term profile?

We have calculated Biocorp's value using a discounted cash flow (DCF) approach, including the value of the business unit that sells connected devices to Sanofi and the core "Manufacturing & Others" business unit. Our estimates factor in an acceleration in revenue growth driven by sales of the Mallya system to Sanofi. It should nonetheless be noted that this partnership is non-exclusive, and that Biocorp is free to forge similar deals under comparable terms with other pharma companies or healthcare actors (pharma, data, insurers, etc.). Our target price is currently €26.9, but it will likely increase by €1.85 when a new partnership is announced and by €2.9 within two years, as the scaling-up of production to 400k units is confirmed. Over the longer term, our TP could increase by 89%, to €52.5, if the company can deliver on its plan to boost annual production capacity to about 1m units by 2023. The probability of success applied will increase to 100% that year if Biocorp has forged additional partnerships to expand its backlog and continue to operate at full capacity. Similarly, we are currently applying an average WACC of 12% to Mallya production, reflecting the risk represented by the scaling-up plan, but we would lower it to 9%, consistent with production lines for the Manufacturing & Others BU.

### Recent performance

Biocorp received CE mark approval for Mallya in June of 2019 and started talks with Sanofi the following month before reaching a deal in December. The contract called for an upfront payment of €5m in 2019, with an additional €1m paid early in 2020 and milestones totalling €14.5m through 2021 subject to Mallya reaching the market. This partnership validated Biocorp's new business model and allowed the company to reach breakeven in 2019. In sum, Biocorp has just entered a phase of strong momentum, one that should accelerate over the coming years. We therefore see 2020 as an excellent time for investors to establish positions in the stock.

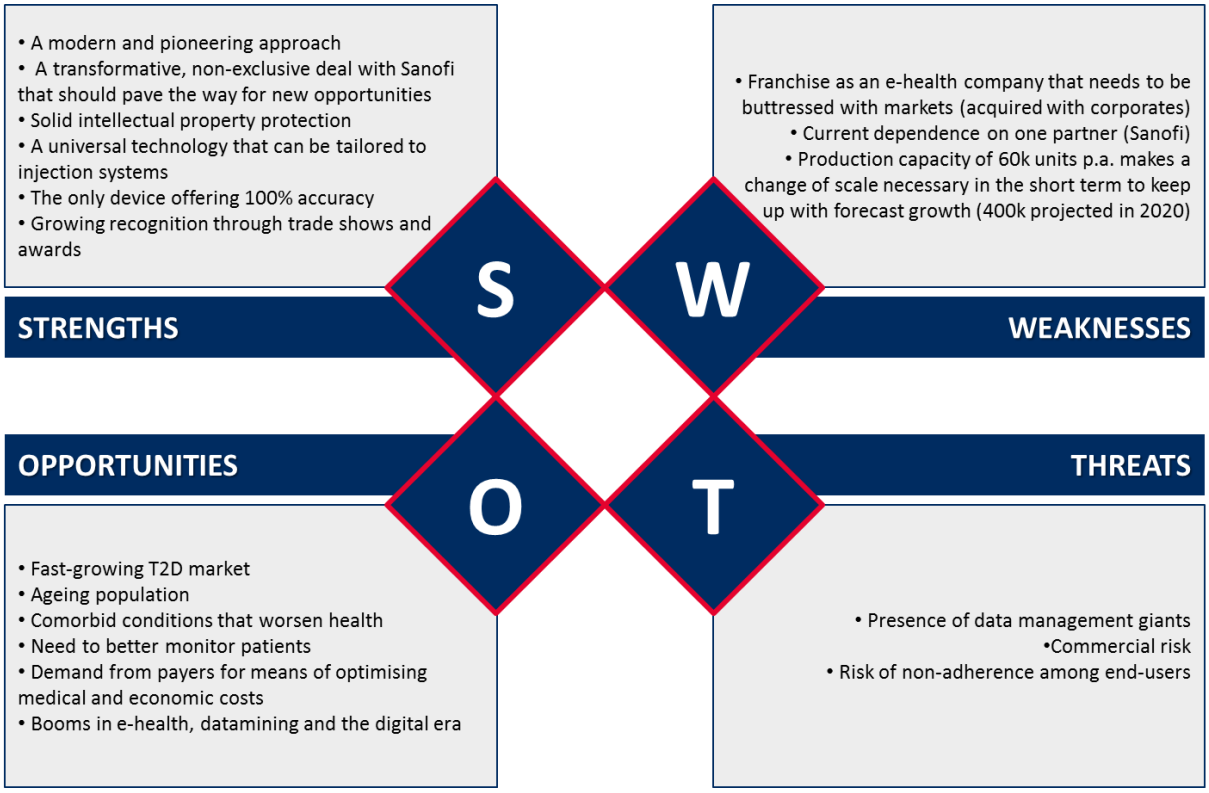
### Future momentum

In our view, Biocorp is on the cusp of a period of very strong momentum thanks to a partnership with Sanofi that guarantees income over the coming years via milestones and revenue from sales of Mallya. As growth accelerates and the company's reputation as an e-health specialist grows, more and more pharma companies active in the field of diabetes are likely to take an interest in it. Moreover, Biocorp is already working to apply its expertise to other areas that require ultra-precise injections, notably therapeutic strategies that involve administering a substitute or analogue for a missing or defective biomolecule. Examples include neurology (progressive degeneration as is the case with Parkinson's) and hormone therapy, a field that is still facing challenges in terms of traceability and precision (growth hormone, fertility treatment, hypothyroid regulation, etc.). These fields thus represent additional growth opportunities for Biocorp beyond insulin therapy.

### Timeline and catalysts ahead in 2020

- The main catalyst that is guaranteed in the short term is the receipt of the €14.5m Sanofi still owes (to be paid in instalments in 2020 and 2021). Not counting revenue from product sales, the contract called for total payments of €20.5m, of which Biocorp has already received €6m.
- Management says it is in advanced talks with potential partners. We therefore see a good chance that Biocorp will announce deals with companies other than Sanofi this year, which would give the stock a big boost.

### SWOT analysis of Biocorp




*Source: Gilbert Dupont*

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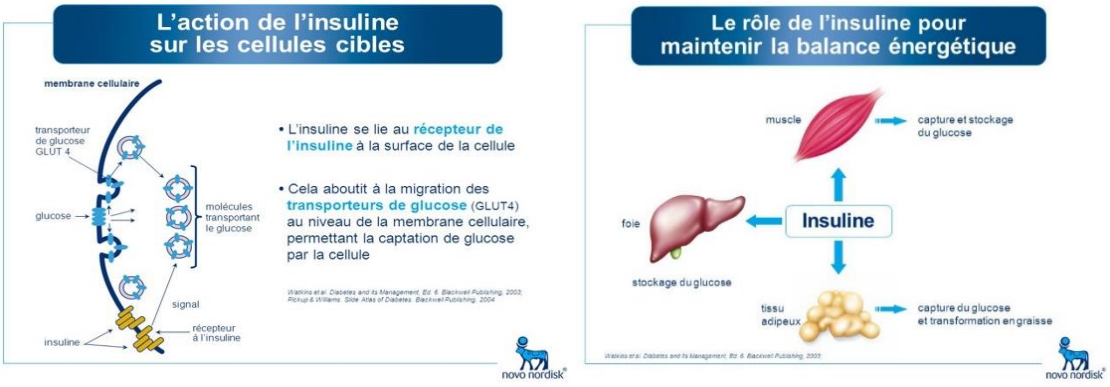
# Type 2 diabetes: A fast-growing market

### Origins and causes of a disease that is well treated

Diabetes is a chronic disease characterised by high levels of glycaemia, or blood glucose. The disease cannot be cured, but patients have different options to treat and control it. Glucose levels rise when insulin, the hormone that regulates glycaemia, is not properly expressed or is functionally impaired.

Insulin, a hormone secreted by the pancreas, allows glucose to be assimilated by the body's cells. Once assimilated, the glucose ingested is converted into an energy source for the body's cells. In healthy, non-diabetic people, insulin plays that role and cells have the energy they need to function. When insulin is lacking or inefficient, as is the case with type 2 diabetes, glucose does not provide energy to the cells. Instead it builds up in the blood and causes blood sugar to increase, a condition called hyperglycaemia. Over time, high glycaemia leads to serious and potentially fatal complications, notably affecting the eyes, kidneys, nerves, heart and blood vessels.

**Action and role of insulin**



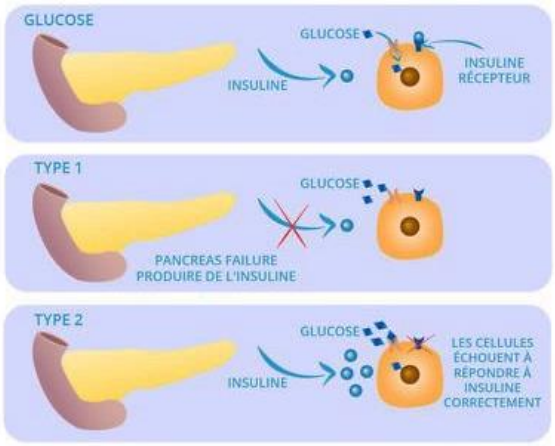

*Source: Novo Nordisk*

The two main forms of diabetes are type 1 (T1D) and type 2 (T2D). The latter is the most common, making up 90% of diagnosed cases. It typically manifests after age 40 but has in recent years been diagnosed in ever younger people and can, it seems, even occur in children within at-risk populations.
T1D, also known as insulin-dependent or juvenile diabetes, is characterised by a total absence of insulin production. With this form of diabetes, patients rely on daily insulin injections or insulin pumps to stay alive.

T2D differs from T1D by its aetiology, i.e. the reasons why it develops:

- T1D: Little is known at this time about the exact origins of type 1 diabetes. In most cases, the pancreatic cells that produce insulin (beta cells) are destroyed by the immune system (IS). The destruction process usually occurs over several years, and begins well before the first symptoms appear. It is not clear exactly what triggers the attack by the IS. Several theories point to a likely combination of genetic predisposition and certain environmental factors;
- T2D: In some type 2 diabetics, the pancreatic cells do not produce enough insulin, while in others, the insulin produced does not work properly: this is referred to as insulin resistance. In both cases, the result is an increase in glycaemia, as the body cannot properly assimilate the sugar ingested to turn it into an energy source.

**Mechanisms of action of diabetes**




*Source: DRSEB.com*

Though the exact causes of T2D are not fully understood, epidemiological studies have identified a set of risk factors. Possible causes are numerous and, in many cases, the disease develops when several factors are combined, including:

- Overweight;
- Large waist circumference, especially adipose tissue around the abdomen;
- Physical inactivity;
- Poor eating habits;
- Arterial hypertension;
- Hereditary factors;
- Ethnicity, some populations being statistically more prone to developing T2D than others;
- In women, having given birth to a baby weighing more than 4.1 kg (9 pounds) seems to be a risk factor as well.

Diagnosing T2D requires directly measuring glycaemia via a blood test. To verify the measurement taken and confirm the diagnosis, clinicians measure glycated haemoglobin (HbA1C) in the blood, which allows them to determine average blood sugar. Since haemoglobin has an average lifespan of 120 days, the test gives a reading of average blood glucose for the previous three months or so. HbA1C should normally be below 7%. People are considered diabetic if their level is 6.5% or higher.
A series of symptoms can send warning signals about overall health and the likely presence of diabetes. But the only way to confirm the diagnosis is to do a blood test to measure glycaemia.

Some symptoms reflect hyperglycaemia and may or may not be present at the time of diagnosis. They may also indicate poor disease management during follow-up visits with diagnosed diabetics, with hyperglycaemia indicating that disease control is poor or that the treatment is not working.
The most common symptoms are:

- Fatigue/somnolence;
- Increased urine volume and frequency;
- Intense thirst;
- Excessive hunger;
- Unexplained weight loss;
- Blurred vision;
- Slow healing of wounds;
- Recurring genital and bladder infections;
- Tingling in hands and feet;
- Increased irritability.

### High comorbidity

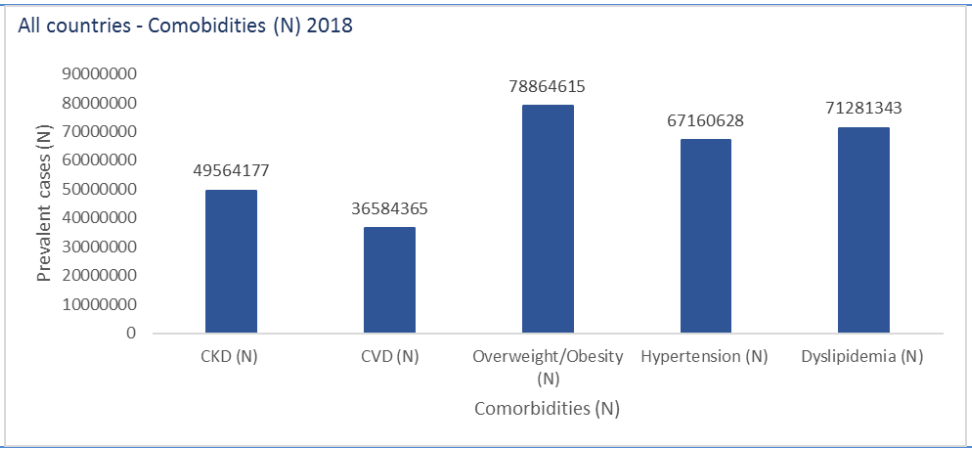
Diabetes is often “accompanied” by other, related diseases. Most of these comorbid conditions require specific care and worsen the overall health of patients, who often end up being heavily treated. The most prevalent comorbid conditions are:

- Overweight/obesity: 61.5%;
- Dyslipidaemia: 56%;
- Hypertension: 53%;
- Nephropathy - CKD (chronic kidney disease): 40%;

- Cardiovascular disease - CVD: 29%;
- Some "glucose-induced" complications such as retinopathy, but also neuropathies potentially leading to diabetic foot (ulceration or destruction of the tissue in the foot, which may or may not be infected, potentially making amputation necessary).

In sum, treating diabetics means not only treating their diabetes by targeting its direct causes, but also preventing potential complications and worsening health due to the development of related pathologies.

**Main comorbidities associated with T2D**

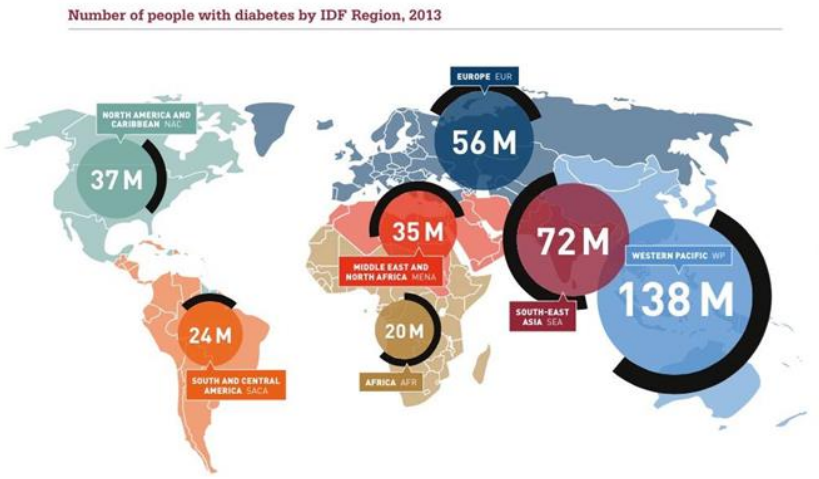



*Source: GlobalData*

**High prevalence: Close to 390m diabetics worldwide**

Diabetes is one of the most common non-communicable diseases in the world. It represents a serious and growing public health problem across the globe. An estimate cited by the International Diabetes Federation (IDF) suggests that the equivalent of 382m people were living with diabetes in 2013 (figure confirmed by GlobalData, whose model put global prevalence at 382m in 2016).

**Prevalence of T2D in 2013**



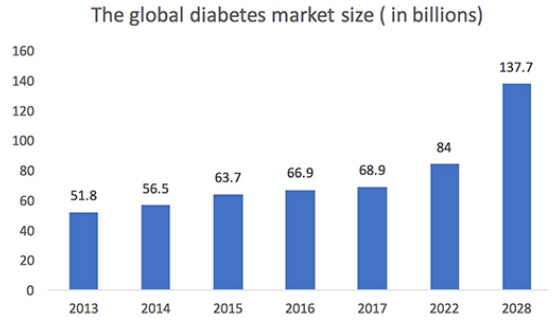

*Source: International Diabetes Federation Atlas*

T2D makes up about 90% of diabetes cases worldwide and T1D and gestational diabetes the remaining 10%. Global incidence and prevalence are expected to rise due to demographic growth, population ageing, urbanisation and the increasing prevalence of risk factors. Some risk factors can be modified, such as obesity, physical inactivity and poor diet. Ones that cannot be modified, including family history and old age, may put people at higher risk of developing the disease. T2D is also associated with a variety of comorbid conditions including chronic kidney disease, cardiovascular disease, overweight and obesity, hypertension and dyslipidaemia. These conditions can affect a patient's quality of life and lead to poor treatment outcomes.

### A fast-growing market: T2D population expected to double between 2016 and 2026

According to the GlobalData report and its EpiCast model, the value of the T2D market will more than double between 2016 and 2026, from $26.8bn to almost $64bn, in the 9MM (9MM = US, France, Germany, Italy, Spain, UK, Japan, China and India). A Pharmexec study also suggests that the market will double between 2017 and 2028, though its estimates are higher than GlobalData's since they include the entire diabetes market (T1D and T2D) and all countries (vs. 9MM in the GlobalData study).

**Size of global diabetes market**

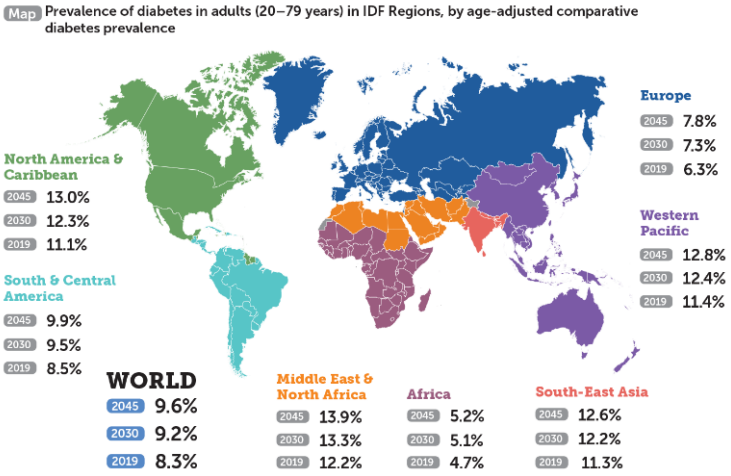



*Source: Pharmexec*

The global T2D treatment market is currently dominated by low-cost generics. Solutions in advanced phases of clinical testing today will reach the market over the coming years. The GlobalData report points to a CAGR of about 8.4%, fuelled chiefly by:

- Higher prevalence driven by a rise in the prevalence of risk factors;
- The progressive nature of the disease;
- Improved diagnostics, which will increase the number of cases identified and treated.

**Prevalence of T2D**




*Source: International Diabetes Federation Atlas*

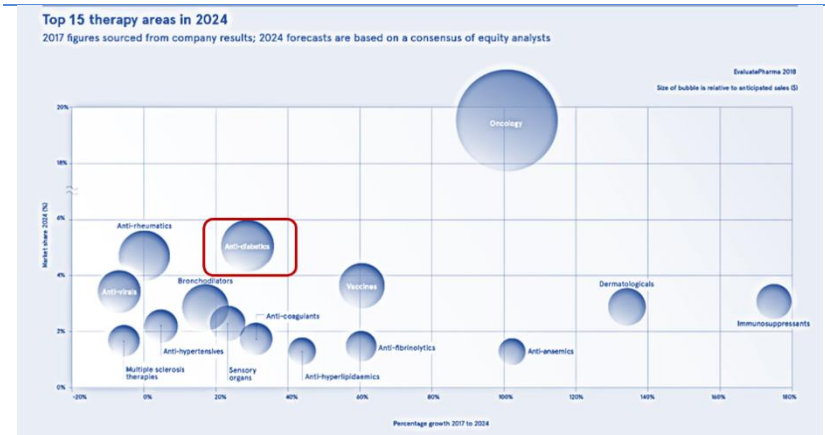
The IDF map above includes epidemiological forecasts for T2D in 2030 and 2045 vs. 2019. The projected growth rate is in line with GlobalData's EpiCast report. It is rather high compared to other diseases, and especially significant in regions where T2D is already a public health priority: the US, MENA and Asia, where growth rates range between 11% and 14%, making them the main market drivers of the future.

### The second most lucrative therapeutic area for the pharma industry

High rates of prevalence, both today and tomorrow, combined with the need to offer patients long-term treatment, make diabetes the second most lucrative market after oncology. And high comorbidity favours a "drastic" approach to disease treatment, notably using multiple therapies. One challenge in tackling the T2D problem is the progressive nature of the disease and the need to find long-term solutions for keeping glycaemia down. The treatments on the market today are efficacious in the beginning both in controlling glycaemia and reducing the rate of complications, but cannot produce lasting effects by reducing the dysfunction of pancreatic β cells. This shortcoming represents a very significant market opportunity. All in all, the steadily rising prevalence of diabetes, together with the increased use of anti-diabetics with non-glycaemic effects, can be expected to drive the T2D market up sharply. And the launch of insulin

biosimilars will accelerate disruptive innovation in the segment. Current trends thus favour using multiple therapies to target both glycaemia and other consequences that cause related diseases, especially cardiovascular ones. Work is also underway to develop solutions for improving patient compliance via medicines that are easier to administer or are taken less often.

**Top 15 therapy areas in 2024 by CAGR**




| Rank | Therapy Area | 2017 sales | 2024 sales | CAGR |
|---|---|---|---|---|
| #1 | Oncology | $104B | $233B | +12.2% |
| #2 | Anti-diabetics | $46.1B | $59.5B | +3.3% |
| #3 | Anti-rheumatics | $55.7B | $56.7B | +0.2% |
| #4 | Vaccines | $27.7B | $44.6B | +7.1% |
| #5 | Anti-virals | $42.4B | $39.9B | -0.9% |
| #6 | Immunosuppressants | $13.7B | $38.1B | +15.7% |
| #7 | Bronchodilators | $27.2B | $32.3B | +2.5% |
| #8 | Dermatologicals | $12.9B | $30.3B | +13% |
| #9 | Sensory Organs | $21.6B | $26.9B | +3.2% |
| #10 | Anti-hypertensives | $23B | $24.4B | +0.8% |
| #11 | Anti-coagulants | $16.8B | $22.9B | +4.6% |
| #12 | MS Therapies | $22.7B | $21.5B | -0.8% |
| #13 | Anti-fibrinolytics | $12.7B | $20.4B | +7.1% |
| #14 | Anti-hyperlipidaemics | $11.3B | $16.4B | +5.5% |
| #15 | Anti-anaemics | $7.6B | $15.7B | +11% |
| | *Other* | *$379B* | *$567B* | *+5.9%* |
| | **Total** | **$825B** | **$1249B** | **+6.1%** |

*Source: Evaluate Pharma 2018*

However, some market studies suggest that current trends show the diabetes market losing steam even as the patient population grows. Sales are declining, notably in France, and growth is slowing across the globe. While the number of patients continues to rise, companies offering treatments are facing increased pricing pressure, notably after European and US governments and agencies announced plans to do more to rein in healthcare spending. To counter the losses they see on the horizon, big pharma is relying on aggressive pricing to preserve market share as biosimilars become available. Amgen is a case in point, notably where diabetes drugs are concerned. It indicated late in October 2018 that it intended to cut the price of its cholesterol drug Repatha by 60% in the US. The announcement was made at time when the debate about high drug prices was raging in that country. Sanofi and Regeneron had also said in May 2018 that they would slash the price of cholesterol drug Praluent in the US from $8,000 to $4,500 p.a. to ensure that more patients could afford it. Praluent competes directly with Amgen's Repatha (and Amgen has been fighting with Sanofi/Regeneron over IP rights to it since 2014).

Repatha is intended for diabetics at high risk of heart attack or stroke. It now costs $5,850 a year, down from $14,523 previously. Pharma cos are motivated to cut prices by concerns that drug consumption will decrease sharply now that the Trump administration has said it intends to drastically cut reimbursement rates for some products for which coverage is apparently up to 80% higher than in other countries. The fear is that this could force many patients to stop a treatment because of the cost, or at least to take less than prescribed. The US Health and Human Services department announced mid-October 2018 that any TV advertisements touting the benefits of a treatment costing more than $35 a month, or covered by public health systems Medicare (for the elderly) and Medicaid (low-income), would have to mention the list prices of the drugs. The resulting pricing pressure has had a tangible effect on the revenue of pharma cos, including those that make diabetes treatments. For instance, Sanofi's Lantus (Insulin glargine = long-acting insulin) has seen a slowing of sales caused not by volumes (Sanofi has maintained its market share) but rather by a pricing effect, reflecting the arrival of competitors and pressure from the government to ensure access for as many patients as possible.

**Historical and forecast trends in sales of Sanofi's injectable insulin drugs**

| | HISTORICAL (ACTUALS) | | | | | | | | FORECAST (MEAN) | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | FY Dec-12 | FY Dec-13 | FY Dec-14 | FY Dec-15 | FY Dec-16 | FY Dec-17 | FY Dec-18 | FY Dec-19 | FY Dec-20 | FY Dec-21 | FY Dec-22 |
| **LANTUS** | **4960,000** | **5715,000** | **6344,000** | **6390,000** | **4761,000** | **3617,000** | **3565,000** | **3012,000** | **2663,111** | **2386,125** | **2196,750** |
| YoY Growth | - | 15,222% | 11,006% | 0,725% | -25,493% | -24,029% | -1,438% | -15,512% | -11,583% | -10,401% | -7,937% |
| **TOUJEO** | **-** | **-** | **-** | **164,000** | **630,000** | **737,000** | **840,000** | **883,000** | **920,143** | **966,429** | **996,000** |
| YoY Growth | - | - | - | - | 284,146% | 16,984% | 13,976% | 5,119% | 4,206% | 5,030% | 3,060% |

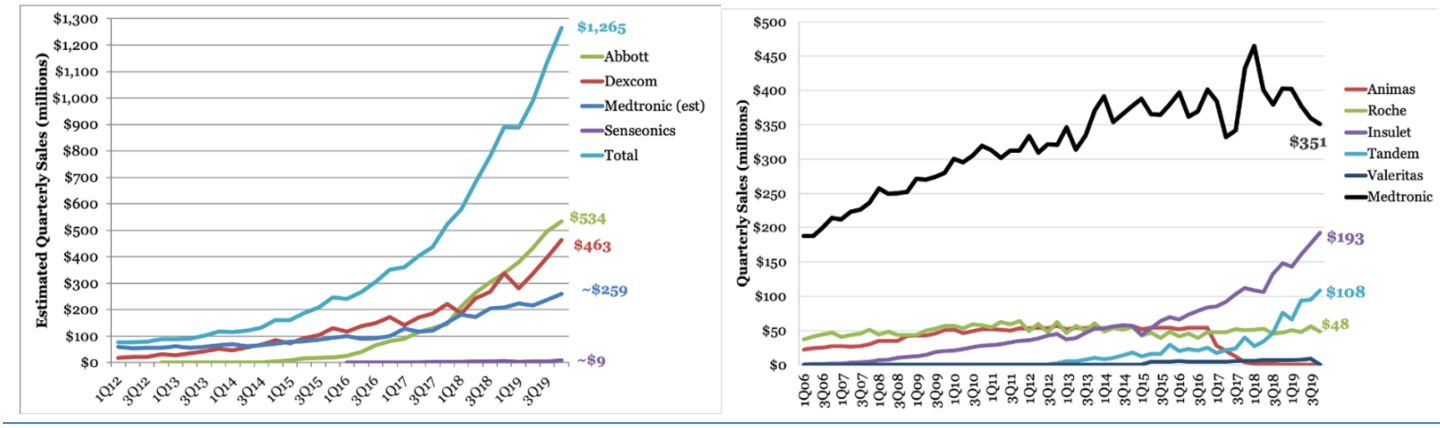
*Source: Reuters*

On the medical device side, two camps are forming: in one, many firms long active in glycaemia control are seeking to pull out of a shrinking market; in the other, makers of insulin pumps are drawing attention, notably with the prospect of delivering an artificial pancreas in the near term. The latter segment is

nonetheless only recording very moderate growth, and has even been losing steam, reflecting how difficult it is to deliver a device that meets the criteria of patients and treating physicians.

A study by Close Concerns concluded that CGM (continuous glucose monitoring) continues to enjoy strong momentum and has overtaken BGM (blood glucose monitoring), a segment that is tending to contract. CGM devices effectively respond to patient monitoring needs, especially for T1D patients, whose glycaemia must be monitored constantly so they can regulate it with insulin injections. This segment of the diabetes market is indispensable and complements the insulin segment. Indeed, one of the risks insulin poses in terms of patient experience is that dosing and the timing of injections must be optimal. Ideally, glycaemia reporting should be continuous so patients can regulate it instantaneously (this is what the pancreas does naturally). It is because they deliver immediate readings that CGM devices are overtaking BGM solutions. And continuous glucose monitoring is equally important for T2D patients, who stand to benefit greatly in terms of comfort and disease care.

**Sales of CGM devices (glycaemia control/left) and insulin pumps (right)**

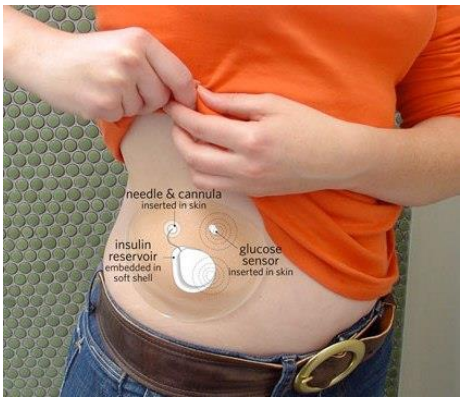


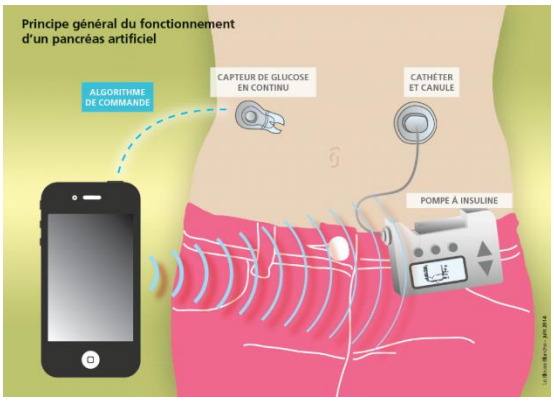

This need for instantaneous results and action also explains the drive to develop devices that reproduce the physiology of the pancreas and release insulin in a "smart" way. The prospect of having an artificial pancreas available is quite appealing, but the first models are still in development and not expected to address all disease-related needs at once. Similarly, insulin pumps, some of which have been on the market for years, have advantages but do not yet emulate the body's natural functions. The companies that have achieved the most success in this segment, some over more than 20 years, are still only seeing moderate sales growth. A device that can deliver insulin continuously meets all the criteria of stakeholders in terms of optimising diabetic care. Four factors may explain why these pumps have been enjoying only moderate growth:

- Mechanical problems can occur, creating a risk of hyperglycaemia and diabetic ketoacidosis. Patients might be able to correct the problem quickly, but there is a non-negligible risk that they will not be aware of these mechanical or technical problems right away. This can notably happen if the tubing (linking the pump to the catheter) is crimped or blocked, if the pump is displaced, or if the user forgets to replace the insulin cartridge or the battery dies;
- There is a risk of infection associated with general device maintenance. If the cannula remains under the skin for too long, beyond the 2-3 days when it is recommended to change it and disinfect the perfusion site, infections can develop;
- The overall cost of use is high relative to other modes of administration. An insulin pump costs ≈€1,750 ($7,000 for Medtronic's MiniMed 2007D) and additional costs of 20 to 45% are usually incurred annually for supplies (insulin cartridges, perfusion sets (cannula and tubing), strips, batteries, etc.). Automated pump systems can be expected to be even more expensive as they include CGM, though the extra comfort will likely considerably offset the extra financial cost;
- Self-management requirements can be a deterrent for some patients. While a pump gives them more freedom in theory, for now, there are no systems that adjust delivery automatically really established in the market (Diabloop is a pioneer in this area in France and obtained a CE mark in November 2018). This means that patients, with help from their doctors, must go through training to (re)learn how to manage their diabetes with an insulin pump. They need to select the insulin doses to inject, which requires closely monitoring their glycaemia and accurately calculating the sugar consumed so they can adjust their insulin doses accordingly. These requirements seem

onerous for many patients, who will opt for "less sophisticated" technologies. Easier-to-use solutions have a clear advantage when it comes to adherence, especially among elderly patients who are less comfortable with technology, but also among patients who have stabilised their glycaemia and may not want to break their routine to learn and train for a new kind of insulin therapy.

**Insulin pump (left) vs. artificial pancreas (right)**

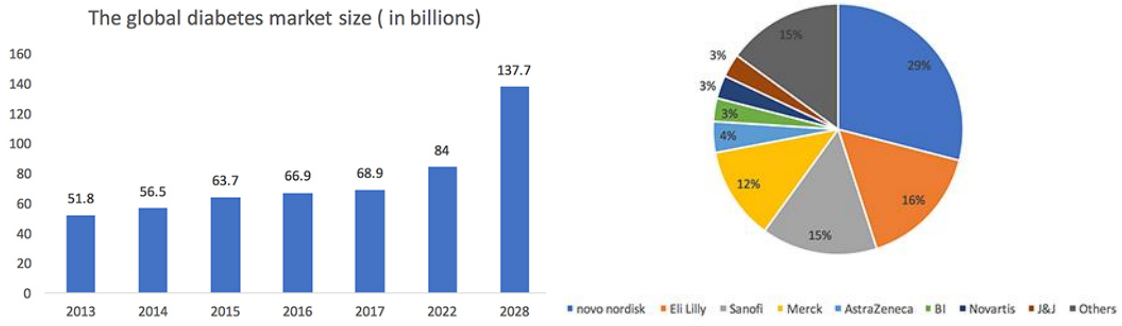



## An oligopoly dominated by a few giants

The diabetes market is currently dominated by sector giants that control different segments and will remain the leaders over the forecast period thanks to the therapeutic strategies they are developing. Novo Nordisk, AstraZeneca, Merck, Eli Lilly, Takeda, Johnson & Johnson, Sanofi and Intarcia Therapeutics are the leaders in question with pipelines that currently include T2D drugs in the pivotal phase or recently introduced to the market, offering them the opportunity to bolster their positions in the diabetes treatment space.

**Size of global diabetes market and players' market share in 2017**

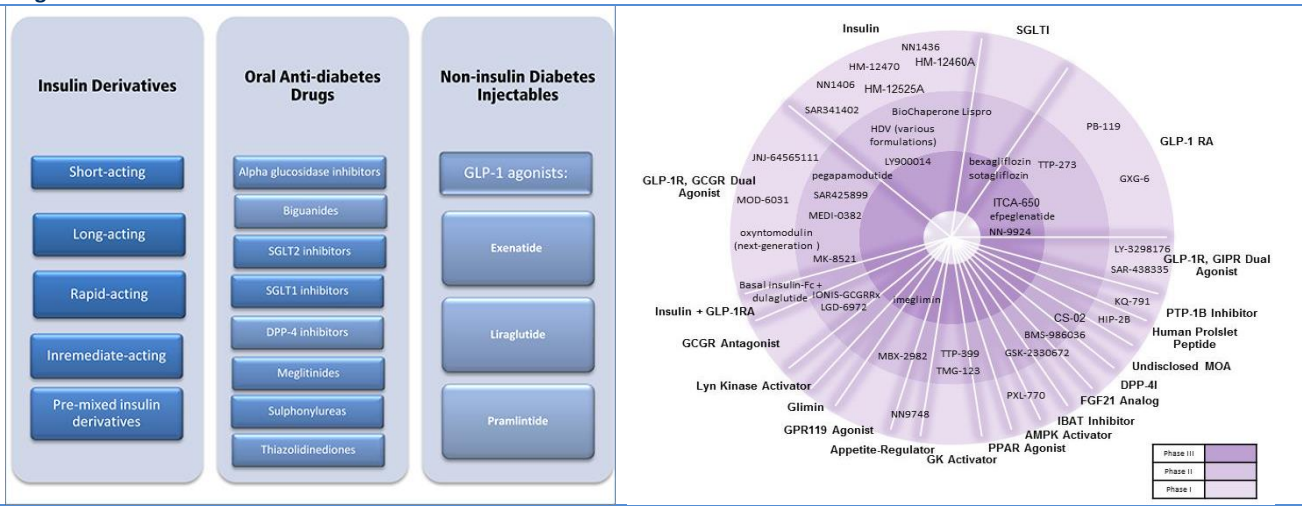



*Source: Pharmexec*

The T2D market is known to be very competitive, but as shown in the chart above, 60% of it is controlled by the three largest players: Novo Nordisk, Eli Lilly and Sanofi. A variety of treatments are in development or on the market. They can be divided into two broad categories:

- Insulin-based treatments;
- Non-insulin therapies.

**Segmentation of T2D treatment market**




*Sources: Visiongain (2016), GlobalData Pharma Intelligence Center (2018)*

As evidenced by the pipeline of mature products in phase III development and those awaiting approval from regulators, there is a good deal of competition in the T2D market. Companies must thus take a non-traditional approach to differentiate themselves and:

- Win significant market share from big pharma, which has more firepower than biopharmas;
- Justify pricing based on the benefits of their products.

For all these reasons, pharma leaders need to find disruptive approaches to preserve their market share. Though more and more drug classes and therapeutic strategies are emerging and being added to the diabetes care pipeline, insulin is the mainstay of treatment.

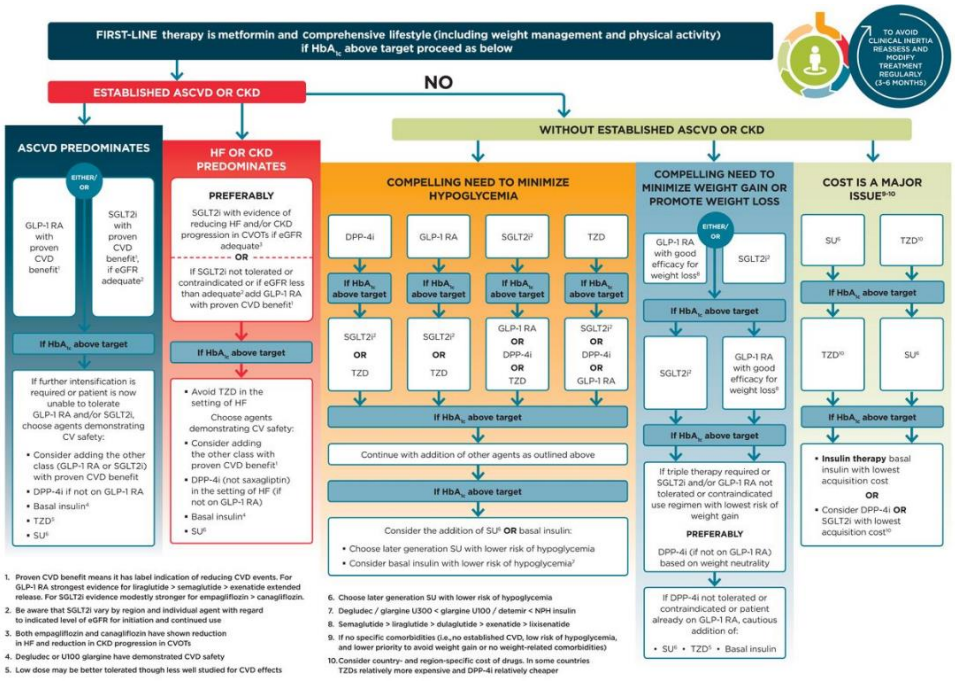
### Insulin is the gold standard of care and still has the lion's share of the market

Some patients may consider insulin therapy burdensome, but it is for now the only treatment available for insulin-dependent diabetes. It is designed to rapidly reduce glycaemia to prevent complications associated with hyperglycaemia. Different types of insulin are used (rapid-acting or long-acting) to adapt the therapy to different times of day. Insulin pumps are devices used to deliver just the right amount of insulin throughout the day and night.

Though insulin's share of the global diabetes treatment market is contracting, demand for insulin continues to grow intrinsically. Indeed, rising prevalence and incidence have driven sustained expansion for insulin in recent years even as other therapeutic solutions have become available. The number of patients taking insulin is rising steadily despite the introduction of biosimilars and products in new drug classes.

In sum, insulin is still the gold standard of care and the most direct substitute for treating diabetic patients suffering from partial or total insulin deficiency. All T1D patients must take insulin, while T2D patients are treated with different therapies as their disease progresses. Most of them are likely to end up needing insulin at some point, depending on the expression and cause of their disease. As shown in the algorithm of T2D patient care below, insulin is the most obvious treatment for most patients nearing the end of their care pathway when other solutions are not or have stopped working and the residual insulin pool becomes insufficient or dries up. Care decisions must take into account medical and economic considerations.

**T2D patient care and pathway algorithm**



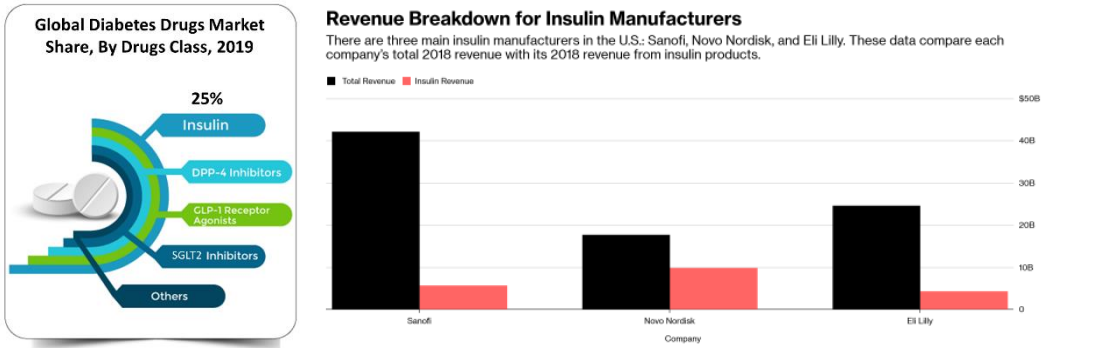

*Source: American Diabetes Association, Clinical Diabetes 2019 Jan; 37(1): 11-34.*

The bottom line is that insulin has a bright future ahead given that various parameters generally favour expansion of the global diabetes market with some specifically boding well for demand for insulin. The combination of population ageing and the rising prevalence of T2D in ever younger patients suggests that more people will become insulin-dependent (i.e. their natural insulin production will become insufficient or stop) earlier and thus require treatment over more years. From an epidemiological standpoint, the fact that there are two categories of insulin-dependent patients should also boost demand for insulin:

- T1D = 100% of patients require insulin as soon as their disease appears and throughout their lives;
- T2D = different epidemiological and physiological factors stand to accelerate growth in this segment. Insulin therapy becomes necessary once the disease reaches a certain stage, i.e. when the pancreas stops producing enough insulin (insulinopaenia) despite oral medicines and lifestyle and diet changes.

All of this explains why insulin is the antidiabetic with the highest market share. A study conducted by Mordor Intelligence showed that insulin made up nearly 25% of the diabetes treatment market in 2019. Growth in this segment is likely to be fuelled chiefly by demand within the T1D population, which stood at more than 30m at end-2019. Though T1D patients only make up 10% of the total diabetic population, their insulin consumption is higher. Another factor driving up demand for insulin is growing awareness of the benefits it offers diabetics, especially in emerging markets. The IDF estimates that diabetic patients spent $760bn on care in 2019, a large share of it spent by T1D patients on insulin products.

**Insulin still the leading product in the diabetes market, with three main players dominating the market**




*Source: Fortune Business Insights (2019), Bloomberg (2018 worldwide revenues)*

In other words, insulin makes up a quarter of all the drugs prescribed for diabetes, and a handful of companies control the market. The table below shows the main insulin products on the market today.

Nearly all the products currently available are made by three companies with Novo Nordisk leading the way, followed by Sanofi and Eli Lilly, which have roughly equal shares as shown in the chart above.

### Insulin products on the market

| BRANDED - APPROVED | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| Drug Name | Manufacturer | Partners | Active Ingredient | Indication | Class of Drug | Patent/Mkt Excl. Expir. | F'19 | F'18 | F'17 |
| Admelog (Insulin Lispro Sanofi, SAR342434) | Sanofi (SAN.FP) | | insulin lispro | Diabetes | Insulin | | | €93 / 0.27% | |
| AFREZZA (Afresa, insulin human [rDNA origin] Inhalation Powder, Technosphere) | MannKind (MNKD) | Cipla Ltd. (500087.IN), BIOMM SA (BIOM3.BZ) | insulin recombinant human | Diabetes Type 1, Diabetes Type 2 | Insulin | | | | $9 (a) / 75% |
| FIASP (FIAsp, NN1218, ultra-fast-acting insulin analogue (Novo-Nordisk)) | Novo-Nordisk (NOVO.B.DC) | | insulin aspart | Diabetes Type 1, Diabetes Type 2 | Insulin analog | | DKK1243 | DKK590 / 1% | DKK99 / 0.09% |
| HUMALOG (HUMALOG KWIKPEN, HUMALOG TEMPO PEN, Insulin lispro mix 50/50, Insulin lispro mix 75/25) | Eli Lilly (LLY) | Lupin Ltd. (500257.IN) | insulin lispro protamine recombinant; insulin lispro recombinant | Diabetes Type 1 | Insulin | 05/07/2013 | $2821 | $2997 / 12% | $2865 / 13% |
| Humulin (Humulin ReliOn, ReliOn) | Eli Lilly (LLY) | Lupin Ltd. (500257.IN) | insulin recombinant human (several variations) | Diabetes Type 1 | Insulin | | $1290 | $1331 / 5% | $1335 / 6% |
| LANTUS (Optisulin) | Sanofi (SAN.FP) | | insulin glargine recombinant | Diabetes Type 1, Diabetes Type 2 | Insulin analog | 01/11/2014 | 30/03/1908 | €3565 / 10% | €4622 / 13% |
| LANTUS (Optisulin) | Sanofi (SAN.FP) | | insulin glargine recombinant | Diabetes Type 1, Diabetes Type 2 | Insulin analog | 02/12/2015 | 30/03/1908 | €3565 / 10% | €4622 / 13% |
| LANTUS (Optisulin) | Sanofi (SAN.FP) | | insulin glargine recombinant | Diabetes Type 1, Diabetes Type 2 | Insulin analog | May 2015 | 30/03/1908 | €3565 / 10% | €4622 / 13% |
| LEVEMIR (Levemir FlexTouch) | Novo-Nordisk (NOVO.B.DC) | | insulin detemir | Diabetes Type 1, Diabetes Type 2 | Insulin | 10/07/1905 | DKK9307 | DKK11195 / 10% | DKK14118 / 13% |
| LEVEMIR (Levemir FlexTouch) | Novo-Nordisk (NOVO.B.DC) | | insulin detemir | Diabetes Type 1, Diabetes Type 2 | Insulin | 11/07/1905 | DKK9307 | DKK11195 / 10% | DKK14118 / 13% |
| NOVOLOG (discontinued) (NovoLog FlexTouch, NovoRapid) | Novo-Nordisk (NOVO.B.DC) | | insulin aspart recombinant | Diabetes Type 1 | Insulin | 06/07/1905 | DKK18060 | DKK18763 / 17% | DKK20025 / 18% |
| NOVOLOG MIX 70/30 (Novolog Mix, NovoMix 30) | Novo-Nordisk (NOVO.B.DC) | | insulin aspart protamine recombinant; insulin aspart recombinant | Diabetes Type 1 | Insulin | 07/07/1905 | | DKK9480 / 8% | DKK10257 / 9% |
| Oral-Lyn* (Oral insulin spray, Oral Recosulin) | Generex Biotechnology Corp. (GNBT) | Shreya Life Sciences Pvt Ltd., Dongsung Pharmaceutical Co., Ltd. (002210.KS), Adcock Ingram Holdings (AIP.SJ) | | Diabetes Type 1*, Diabetes Type 2* | Insulin | 02/01/2022 | | | |
| Ryzodeg 70/30 (Degludec + NovoRapid, DegludecPlus, insulin degludec/insulin aspart, NN5401, SIAC) | Novo-Nordisk (NOVO.B.DC) | | Insulin | Diabetes Type 1, Diabetes Type 2 | Insulin | | | DKK714 / 1% | DKK492 / 0.44% |
| Soliqua (Fix-flex, iGlarLixi, LixiLan, Lixisenatide (combination pen device), Lixisenatide + Lantus combination, Lixisenatide/Insulin Glargine, Suliqua) | Sanofi (SAN.FP) | Zealand Pharma (ZEAL.DC) | insulin glargine; lixisenatide | Diabetes Type 2 | Insulin | 12/07/1905 | 01/05/1900 | €73 / 0.21% | €26 / 0.07% |
| TOUJEO (HOE901, Lantus XR, New Insulin U300, TOUJEO MAX SOLOSTAR, U300) | Sanofi (SAN.FP) | | insulin glargine recombinant | Diabetes Type 1, Diabetes Type 2 | Insulin analog | | 01/06/1902 | €840 / 2% | €816 / 2% |
| Tresiba (Degludec, insulin degludec, NN1250, SIBA) | Novo-Nordisk (NOVO.B.DC) | | insulin | Diabetes Type 1, Diabetes Type 2 | Insulin | 22/07/1905 | DKK9259 | DKK8035 / 7% | DKK7327 / 7% |
| Xultophy (Degludec and liraglutide, Degludec and Victoza, IDegLira, NN9068) | Novo-Nordisk (NOVO.B.DC) | | insulin degludec; liraglutide | Diabetes Type 2* | Insulin | | DKK2210 | DKK1614 / 1% | DKK729 / 1% |

*Source: FactSet*

### Multiple growth drivers

As mentioned above, a variety of parameters and factors make the outlook bright for the insulin market. While the segment may be poised to lose some steam over the coming years, notably due to the launch of competing products, insulin will clearly remain a mainstay of diabetes treatment. We have identified four growth drivers that should allow the main insulin makers to preserve if not expand their market share if they are able to wisely position themselves in certain segments. A few of these leaders have been pioneers in terms of differentiation, especially Sanofi, which stands apart for the disruptive approaches adopted to establish itself in the diabetes market, as we discuss in the next section.

**1/ Prevalence**: This is the most traditional growth driver, and thus the one where there is the most competition. The segment includes all new diabetics. All sector players fight over this market, established ones and especially new entrants. While each is likely to win some of these new patients, companies will also need to position themselves on the most buoyant geographic markets.

**Robust growth in certain geographic markets**

Table Top 10 countries or territories for number of adults (20–79 years) with diabetes

| Rank | 2019 Country or territory | 2019 No. of people w diabetes (millions) | 2030 Country or territory | 2030 No. of people w diabetes (millions) | 2045 Country or territory | 2045 No. of people w diabetes (millions) |
|---|---|---|---|---|---|---|
| 1 | China | 116.4 | China | 140.5 | China | 147.2 |
| 2 | India | 77.0 | India | 101.0 | India | 134.2 |
| 3 | United States of America | 31.0 | United States of America | 34.4 | Pakistan | 37.1 |
| 4 | Pakistan | 19.4 | Pakistan | 26.2 | United States of America | 36.0 |
| 5 | Brazil | 16.8 | Brazil | 21.5 | Brazil | 26.0 |
| 6 | Mexico | 12.8 | Mexico | 17.2 | Mexico | 22.3 |
| 7 | Indonesia | 10.7 | Indonesia | 13.7 | Egypt | 16.9 |
| 8 | Germany | 9.5 | Egypt | 11.9 | Indonesia | 16.6 |
| 9 | Egypt | 8.9 | Bangladesh | 11.4 | Bangladesh | 15.0 |
| 10 | Bangladesh | 8.4 | Germany | 10.1 | Turkey | 10.4 |

For confidence intervals, see full IDF Diabetes Atlas, Table 3.5.

*Source: International Diabetes Federation Atlas*

Estimates from different consultancies suggest that global T2D prevalence will rise at a CAGR of between 8 and 10% with more robust growth rates in certain regions due to genetic factors and lifestyles. The table above shows an overview of the ten countries with the highest number of diabetic adults in 2019, 2030 and 2045. The list can be expected to change slightly in qualitative terms, and Germany will likely be replaced by Turkey. The Turkish population in Germany shows the highest prevalence, and estimates suggest that prevalence in Turkey will rise by enough for that country to take Germany's place in the list. These are the geographic areas that companies will need to target in priority to capture a significant share of the market for new diabetes patients.

**2/ Under-diagnosis**: T2D is an under-diagnosed condition. According to the IDF, 46%, or nearly half of the people living with T2D, are undiagnosed. Capturing this "neglected" population will require some effort, including the development of new diagnostic tools and, more importantly, the education of patients and doctors about monitoring at-risk individuals. Better diagnosis could in theory nearly double demand for currently available diabetic products, creating a major investigation and revenue opportunity for makers of insulin and diabetes drugs in general. Under-diagnosis rates are probably highest in under-developed and emerging markets, where people have access to less information about chronic diseases than in developed countries, where better access to care and diagnostic tools favours treatment in the earliest stages of the disease. IDF estimates that ¾ of diabetes patients live in low- and middle-income countries.

**Nearly half of actual diabetes cases are undiagnosed**


*Source: International Diabetes Federation Atlas*

**3/ Compliance**: This field is overlooked and therefore represents a real opportunity for companies. Certain epidemiological studies (see next chapter) suggest that compliance is good among fewer than 40% of T2D patients, implying that there is an opportunity to encourage more than 60% of them to follow directions from healthcare experts. The potential for existing players is substantial. Indeed, in addition to competition being very weak in this segment, there are several advantages in targeting non-compliant patients:

- They have been diagnosed and therefore know they have the disease and are being treated for it. They are already on a care pathway;
- They are already "acquired" for companies that decide to target the subpopulation of patients who use their products but are not compliant. These patients do not need conversion, as they are already product users. Rather, they need support and/or assistance with taking medication.

These are real advantages and they can be turned into bona fide growth drivers for the pharma leaders that target this segment, since:

- It will not take much effort to capture market share, as the patients in question are already being treated;
- It represents an opportunity for pharma cos to cover a larger share of their market.

**4/ Adherence**: The idea here is to "win over" patients by targeting their treatment adherence. The challenge for these individuals is not so much compliance as being "comfortable" with one treatment vs. another. Opportunities in this area are dependent on several dimensions:

- Therapeutic: A treatment's efficacy in effectively controlling glycaemia;
- Wellbeing: Tolerance, with no effects that are debilitating or too unpleasant for the patient;
- Psychological: Adherence to a given mode of administration, and all that accompanies it, by finding an ease of use that is in sync with the patient's habits and desired level of comfort of use. Other factors that will contribute to the expansion of the insulin market include the rapid development of new insulin administration systems, drugs and analogues.

Biocorp is in a position to gain ground in all four areas, but it is today chiefly targeting compliance, where it plans to offer better patient support, and adherence, thanks to insulin pens that are known to offer easier administration and greater comfort than other existing systems.
The company also plans to target new T2D/T1D patients (disease just developing) as well as naïve T2D patients, i.e. those who do not know they have T2D (undiagnosed) and in whom it is discovered belatedly, leaving time for the disease to progress to the most advanced stages – most of whom require insulin therapy. We nonetheless estimate that, as of today, the most promising market for Biocorp is the population of T2D patients already on insulin, as these patients are "acquired" but need:

- Better compliance, in line with medical requirements and recommendations (compliance channel);
- Access to an easy-to-use solution, especially for those patients diagnosed relatively recently and whose insulin therapy requires more adjustment (adherence channel).

# Compliance as the new growth driver

### T2D: A chronic disease plagued by poor compliance

A 2014 report from IMS Health (since merged with Quitiles to become IQVIA) suggested that for the six most common chronic diseases in France, massive compliance failure alone adds more than €9bn to healthcare costs. Patients are considered non-compliant if they take less than 80% of their prescribed medication whether in terms of duration or dose. The IMS Health report highlighted that only about 40% of patients are compliant. This gives an idea of what it will take to increase compliance from such a low level, and of the extra costs chronic non-compliance represents. The IMS Health study examining the six most common chronic diseases in France found that compliance was just 13% for those with asthma, 36% for those with heart failure, 37% for T2D patients, 40% for those with high blood pressure, 44% for those with hypercholesterolemia and 52% for those with osteoporosis.

Effectively addressing this huge gap requires looking at it from two angles. Indeed, it seems that compliance depends not only on the objective seriousness of the disease but also on how the patient lives with it. In other words, there is a psychological component to compliance, as mentioned in the discussion about adherence above. According to the IMS study, non-compliance is a multifactorial global phenomenon for which there is neither a culprit nor a punishment, just a need to create the best possible conditions for patients to benefit from their treatment. The behaviour cannot be explained solely by the constraints associated with the medication. Unfortunately, the result is that only a minority of patients benefit fully from their treatment. The challenge is thus to improve compliance in order to make treatment more efficacious, which will in turn change patients' perception of it. Where insulin is concerned, injections must be calculated based on glycaemia measurements, levels of physical exertion, and the consumption of meals. Insulin needs can thus vary over the course of the day, meaning that insulin therapy must be adapted. This is a complex aspect of disease treatment and it may take patients months or even years to use insulin "properly".

Bearing this in mind, maximising treatment efficacy requires identifying where non-compliant patients are going astray. Various long-term studies have highlighted the key aspects of chronic treatments: difficulties with follow-up and reporting, the need for guidance (assistance with regime) and coaching (to encourage compliance), and (inter)active support until such time as the patient has adapted to and is regularly taking the treatment. All these dimensions must be considered components of a patient's relationship to treatment so that the medicine eventually comes to be seen not as a cost item but rather as a factor of efficiency.

### Non-compliance adds billions of euros in medical and economic costs

In addition to depriving patients of efficient treatment, compliance failure also carries a fairly high cost, much of it preventable, mostly in terms of complications. The IMS study calculated the direct cost of just the complications most often seen with the six main chronic diseases in France:

- For arterial hypertension, the main complication is stroke;
- For T2D, it is coronary disease;
- For hypercholesterolaemia, it is acute myocardial infarction;
- For heart failure, it is pulmonary oedema;
- For osteoporosis, it is osteoporotic fractures;
- And for asthma, it is acute severe asthma.

The direct cost of stroke related to arterial hypertension alone amounts to €4.4bn a year. Taking the six diseases together, the study suggests that potential savings could be as high as €9.3bn p.a. Beyond citing figures, it talks about the suffering patients endure and the indirect costs to society of these patients missing work or being unemployed. It is also important to know that France is not an outlier: these numbers are consistent with international data.

Where diabetes is concerned, more specific studies were done to assess the direct cost of treating T2D in France. They showed that the complications and comorbid conditions associated with diabetes result in huge costs to society. One study conducted in France in 2013 and published in *Revue d'Épidémiologie et de Santé Publique* estimated T2D-related costs, drawing a distinction between those directly attributable to the disease and its complications and those associated with managing the disease and its effects. The data used in this study came from a database kept by the French health insurance system. Within the 600,000 patients randomly selected from that database, T2D patients were identified and selected based on their consumption of hypoglycaemic agents but also on whether they are listed as long-term diabetes

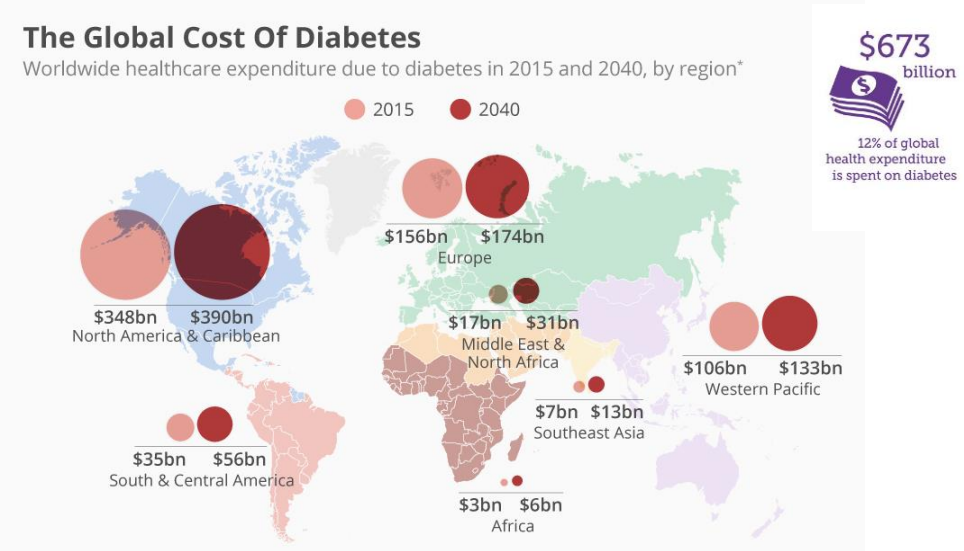
patients and/or were diagnosed while in hospital. The approach taken and cost estimates were based on a collective perspective, comparing healthcare spending in T2D patients against those in a population that is comparable in terms of age, sex and place of residence.
An analysis comparing 26,000 T2D patients to 76,400 comparable non-diabetic subjects showed that total annual healthcare spending per person was €6,506 for T2D patients vs. €3,668 for non-diabetics, meaning that spending was 77.4% higher for the former as a direct result of T2D.
There were also differences with the T2D population in terms of expenditures:

- Hospitalisation (33.2% of total spending);
- Spending in pharmacies and on products from retail pharmacies (23.8%);
- Medical assistants (13.5%);
- Doctors visits and medical procedures in private practices (11.5%).

While little difference was observed between costs incurred by patients treated with monotherapy, dual therapy or multi-therapy, spending was much higher in those treated with insulin vs. without it (€12.88 vs. €4.84), underscoring how much work needs to be done within the insulin-dependent population. Based on the estimated costs for this sample, researchers were able to extrapolate the data to estimate that in France, total direct costs attributable to T2D exceeded €9bn in 2013. The high social and economic cost of this disease makes it a major public health priority.

The data from France is consistent with global trends, with analyses showing that 12% of total healthcare spending is for diabetes. This puts the total global cost at $673bn a year, or an estimated $1,330 per person in 2010.

**Diabetes-related health spending in 2015**




*Source: International Diabetes Federation Atlas 2015*

**Using e-health to improve compliance**

This medical and economic reality makes compliance an ever more important research priority for sector players with different profiles. E-health has only increased interest in compliance as it has enabled the development of a variety of algorithmic approaches to collecting data. The goal is to track medication-related behaviours and habits more closely in order to:

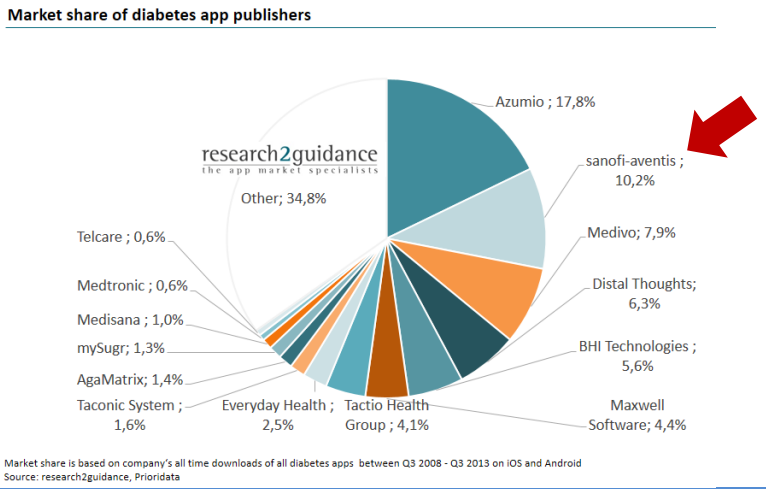
- better understand the roadblocks on the care pathway;
- better identify the profiles of the most at-risk patients in terms of compliance;
- improve follow-up and patients' relationship to their treatment, and optimise patient relations with their treating physicians.

Many other goals can be pursued as well, both at the general (datamining) and individual levels, to encourage better compliance in a personalised way.
This is the primary focus of a growing number of sector companies, including among the big pharma, which has understood the benefits of capturing market share they have only won in name and which represents a major income opportunity for them. These companies also benefit indirectly when payers have a more favourable perception of the benefit/risk of their treatments, as reimbursement rates are based not only on efficacy but also of efficiency.

For all these reasons, a number of companies active in diabetes management are working to develop connected applications and technologies. Among the leaders, Sanofi stands out because it was one of the first to move into this part of the ecosystem.

According to a study conducted by Research2Guidance, 14 of the most popular applications account for 65% of the diabetes app market. Not counting large groups like Sanofi, most diabetes app makers are pure players and smaller firms for which app publishing is the core activity. This makes it very likely that we will see a high level of M&A and long-term collaboration deals in the near future.

### Market shares of diabetes app publishers




*Source: Research2Guidance*

However, the "Diabetes App Market 2014" study showed that the competitive landscape in the diabetes app market was still in flux. It concluded that the list of the top 14 diabetes app publishers was not set in stone and that overall quality, total downloads and user numbers were not high enough to prevent new companies from matching the best practices of diabetes app publishers while adopting smart marketing strategies to shake up the market.

The competitive landscape has most likely evolved quite a bit since 2014, since this sector is by definition extremely fluid and fast-changing. Yet the key takeaway as concerns our coverage initiation is that Sanofi ranked second at the time, with 10% market share, notably thanks to its two main diabetes apps, GoMeals and iBGStar.

Mobile health solutions should be able to provide support for diabetics, notably by helping them better manage their condition and therefore reduce healthcare costs. Diabetes apps can improve patients' lives by encouraging them change their behaviours, facilitating communication, and allowing them to track all aspects of their disease. The study suggested that diabetes is the therapeutic area that holds the greatest sales potential for mHealth applications. Different apps target different populations (patients and/or health professionals) within the broader diabetes ecosystem.

The report stressed the fact that mobile apps for diabetics were not used much at the time despite the growing number of companies working on and investing in the segment. In 2014, just 1.2% of diabetes apps were used, vs. an estimated 7.8% in 2018. These figures suggest that there is a significant potential to be tapped, and that major progress has been made in recent years. Indeed, the report makes clear the lack of sophistication of mobile apps for diabetics by today's standards. Various factors can be expected to accelerate growth in the mobile app market:

- Apps are becoming a tool for selling devices including glucose monitors, wearable sensors, injection systems, and services such as remote monitoring / consultations;
- Growing competition between companies should lead to products of higher quality and sophistication, and ones that are easier to use. In other words, new apps will match existing standards and also better reflect the requirements of diabetic users;
- Traditional payers cover the cost of apps in countries where annual diabetes treatment costs are high, and this is also likely to stimulate competition between app publishers.

### Very significant potential benefits for all stakeholders

Given the many benefits of improving compliance, there is a nascent market for using AI in diabetes treatment. The field of applications is vast, though the purposes and aims are not the same for all players. Indeed, mobile apps are not intended "solely" to help patients passively keep up with their treatment.

Most apps include evolutionary algorithms that gather data for datamining purposes, enabling analyses that can help address the questions and issues encountered at different levels. We have identified four priority targets for these mobile apps:

**1/ Patients**

For the reasons cited throughout this report, it is clearly in patients' interest to use embedded systems and/or apps to better follow their medication schedule, as these systems and apps 1/ facilitate injection and dose reporting, 2/ help them track their treatment on a daily basis and sharply improve compliance, 3/ and make the treatment more efficacious, which in turn gives patients a more positive perception of the constraints associated with chronic treatment. A study conducted by Eli Lilly in 2016 concluded that the main reason why T2D patients on insulin stop their treatment is that they fear hypoglycaemia and weight gain. It showed that a quarter of T2D patients stop insulin treatment within the first year, and 20% go untreated the following year as well. Of the 137 patients surveyed for the study (in France and European countries), 50 continued their insulin treatment, 50 suspended then resumed it, and 37 stopped altogether. The two reasons main cited by those who stopped were:

- Hypoglycaemia. This risk was cited by 22% of patients as a reason to stop the treatment, but just half of those who effectively stopped had experienced episodes of hypoglycaemia;
- Weight gain. Just 44% of the patients who cited this as a concern effectively gained weight among the patient group, and among those who stopped taking insulin, only 58% stopped because they had actually gained weight.

On the other hand, patients who continued taking insulin said it was because their glycaemia was better under control, they felt better physically, and they were convinced that insulin was the best way to reduce the risk of complications associated with diabetes.

**2/ Treating physicians**

For doctors, access to reporting data and the ability to track quantitative and qualitative parameters in a format that is analysable and reliable (since it cannot be altered by the patient) makes it possible to accurately monitor the treatment the patient is receiving. They can use this data to give advice and recommendations and to make necessary adjustments. Moreover, since data is available instantaneously, physicians can monitor patients without seeing them in person, and be more proactive and responsive when patients' behaviours or response to treatment so require. The 2016 Eli Lilly report mentioned above also stressed the role treating physicians play in patients' staying on insulin treatment. Those who did not discontinue treatment cited their doctors' advice as a key factor in their decision. And those who stopped but then started again also said they were persuaded to resume by their doctors, among other people (friends and/or family). Likewise, one of the main reasons cited by patients who stopped insulin therapy altogether was that their doctor suggested they do so. They considered that their doctors had not taken their viewpoints into consideration. This type of feedback was more common in this group than among those who did not stop their insulin treatment.

Another interesting point made by the study is that even among patients who had stopped taking insulin and not resumed as of the survey date, 62% said they were slightly or very open to the idea of starting again. Nearly half of those who had stopped said their glycaemia levels were close to when they were taking it, though more incidences of uncontrolled hyperglycaemia were reported.

All of this underscores the important and influential role of treating physicians in encouraging patients to continue insulin therapy, especially early on, when they must help identify and address patient concerns about their treatment. In a word, it is very much in the interest of treating physicians to have access in real time to reliable data that is qualifiable and quantifiable.

**3/ Payers**

This is a very important target for app publishers, since insurers are the ones that decide what percentage of treatment will be covered, based on benefit/risk assessments and medical benefits. Payers have been working on compliance solutions in-house for several years but with little success. A study conducted by Research2Guidance in 2015 showed that a few insurers had developed apps that did not take off. This failure was attributed to the fact that insurers did not invest much in developing the apps, as they had underestimated what it would take to significantly boost adherence among users.

Most health insurers are reticent about publishing apps since they have not had a major impact so far. The report estimates that more than 2/3 of these companies' apps had been downloaded fewer than 100,000 times within a year of their launch. There are several reasons for this:

- Most insurance companies do not produce "cutting edge" apps. The report underscored that in most cases, the apps did not include the six keys to success, i.e. 1/ follow-up and coaching functions, 2/ automated data entry, 3/ teleconsultations, 4/ secure use of mHealth data, 5/ integration of solutions into the current healthcare IT infrastructure, and 6/ user-friendliness;

- Insurers do not offer rewards to encourage patients to use them. They are nonetheless the players in the value chain that have the most opportunity and incentive to "reward" good compliance practices and lifestyle habits. A rewards system could encourage patients to take initiatives to follow doctor recommendations in terms of medication and compliance in order to earn rewards directly related to their treatment coverage (for reasons relating to standards and ethical obligations).

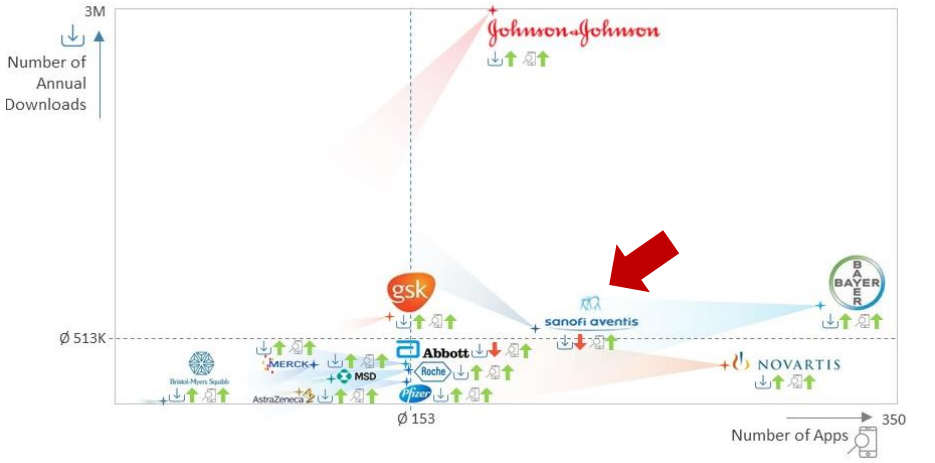
**4/ Pharma companies that are already established in the diabetes market**

There are also several examples of pharma companies making forays into the digital market and standalone apps. They too have missed the mark, as illustrated by a 2017 Research2Guidance study showing that just 0.5% of the apps developed had generated more than 100,000 downloads in a year in 2016. This was below the 2.0% recorded in 2014, even though the number of apps developed by pharma companies doubled between 2014 and 2017. These numbers are proof that while pharma companies are determined to move into the digital space and willing to invest in that effort, they have a hard time developing adapted products. The average size of companies' app portfolios has increased from 65 to 153, but average annual downloads per app still stand at a low 3.3k.

This downtrend is attributable to three key factors: 1/ growing competition from mHealth developers, 2/ the fact that pharma companies' app portfolios target a narrower population than those of mHealth players, and 3/ apps developed by pharma companies tend to lag those of mHealth players, especially in terms of quality. The product development cycles of conventional pharma companies are often incompatible with the digital products they offer given the rate at which technology evolves, making their services obsolete before they are launched.

**Positions of pharma companies within the app universe**

*Number of apps versus downloads (2016 versus 2014) per leading Pharma company*

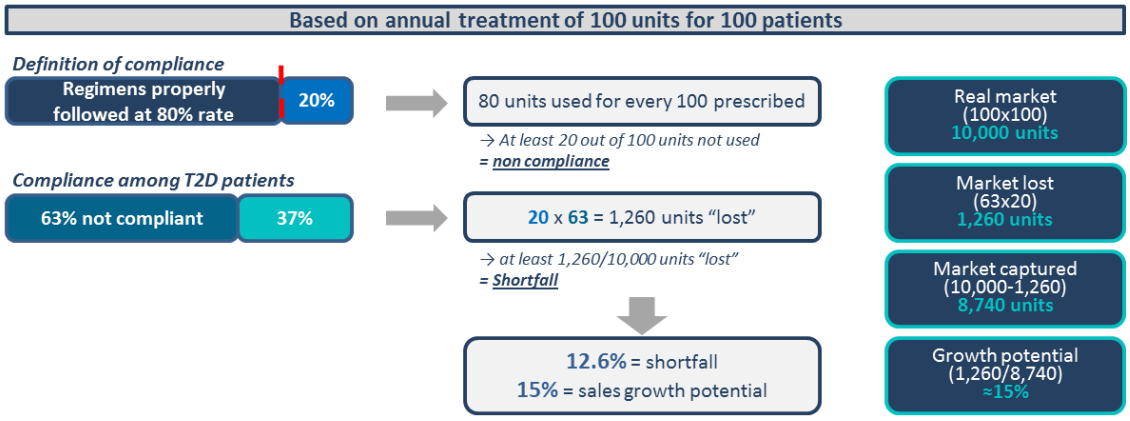



Note: App numbers based on unique apps. Annual downloads based on 2016 data. Data extracted; 03.05.17. Arrows indicate 2014 to 2016 trend. Shading indicates 2014 to 2016 place movement. Star indicates app and download numbers for 2016.

*Source: Research2Guidance 2017*

We can measure the results of different surveys against the revenue shortfall poor T2D treatment compliance represents for pharma companies in order to try to assign a value to that shortfall. We know that compliance is good among only 37% of T2D patients, meaning it is poor for 63%. For healthcare authorities, compliance is poor when patients take 80% or less of the recommended treatment either in terms of doses or duration. As shown in the graph below, pharma companies could add at least 15% to their revenue, on a same-scope basis and not counting organic growth, by winning new market share in this area. Indeed, the shortfall created by poor compliance among T2D patients is estimated at 12.6%. Using this as a starting point, we calculated that Sanofi, for instance, just by improving compliance among patients currently taking Lantus, could (conceptually) have generated €452m of additional sales in 2019: Lantus FY 19 sales = €3,012m, hence a shortfall of €452m.

**Shortfall created for pharma cos by poor compliance**




*Source: Gilbert Dupont / NB: 15% is a low estimate as it offsets the units effectively purchased but not used (the pharma co still generates sales on these) and patients for whom compliance is well below 80%.*

Bearing this in mind, health insurers and pharma companies can be expected to team up with digital experts to bolster their positions in the "e-diabetes" market. The fact is that digital is not a core area of expertise for them, putting them at a disadvantage to mHealth specialists that are often pure players. Moreover, the size of large companies and their decision-making processes are not compatible with fast-changing markets that require extreme responsiveness and quick decisions. In conclusion, pharma companies and health insurers clearly recognise the benefits of AI, but cannot compete with pure players. This is why so many large groups are working to create digital ecosystem strategies and letting external firms drive digital innovation. Positive results are already visible in terms of improved brand image, digital innovation adoption, and new product distribution channels.

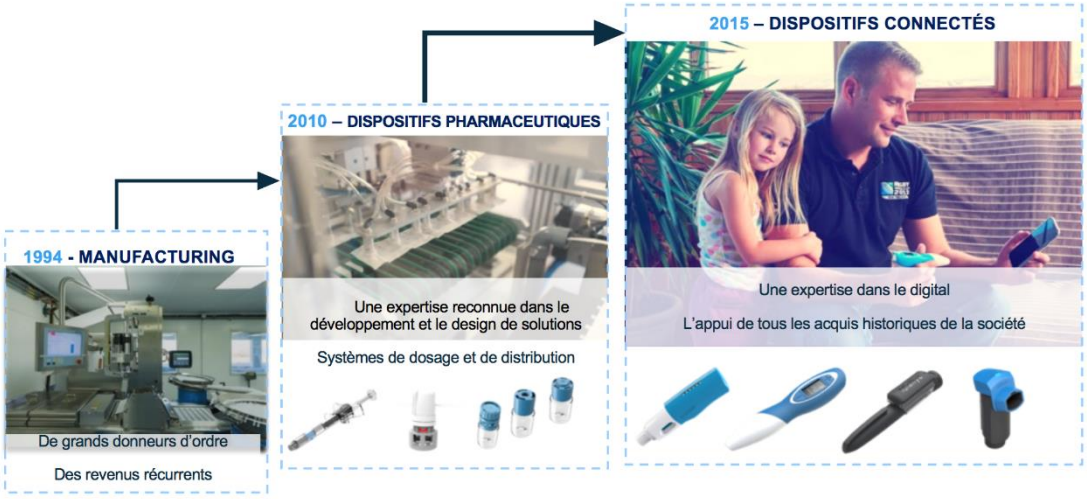
# Biocorp: Connecting to improve treatment

**A business model that is changing, a strategy focused on partnerships with diabetes market leaders**

When it was founded in 2004, Biocorp specialised in manufacturing. Starting in 2010, it created a new franchise, making devices for the pharmaceutical industry, notably dosing and dispensing systems. Since 2015, Biocorp has leveraged its recognised expertise to adapt its core manufacturing activity and enter the digital era. It is today known as a developer of connected devices with a range that includes several products incorporating the digital technologies it has developed.

Biocorp has thus successfully transitioned from a "family" company making containers for the pharmaceutical industry to a "modern" firm that has carved out a place for itself in the e-health space. This transformation led to a management shake-up, with founder and CEO Jacques Gardette stepping aside in December 2019 to let Eric Dessertenne take over as CEO. Dessertenne will be leading the charge to step up sales growth in the new franchise after serving as head of business development since 2014 and then as COO since March 2017. Over this period, he played a key role in transforming the company's business model and helping it step into the digital era.

**Evolution of Biocorp's business model since it was founded**




*Source: Biocorp*

This shift in the business model, completed in just a few years, has solidly anchored Biocorp in the connected device industry. It was orchestrated in a gradual and logical manner. Over the years, Biocorp identified the needs of its clients in the pharma industry, specifically as they related to the products for which it was already making containers. Though the company initially provided "mechanical" solutions guaranteeing safety in terms of how medicines are dispensed and containers opened, it subsequently began offering "data collection" solutions as well. The safety of individual patients was still its main focus, but it was also taking a bigger picture approach. Pharma companies had begun looking into datamining a little more than a decade prior and many made forays into the digital space on their own, often with little success. The goal of e-health is of course to improve care for individual patients, but it addresses macro issues as well. These early initiatives led to the creation of a new ecosystem that has become inclusive and is now open to a range of firms that all bring specific expertise to fill the gaps along the value chain.

Thanks to its history and close ties with the pharma industry, Biocorp was quick to understand what big pharma required in terms of monitoring patients, especially those with chronic diseases who need to inject or inhale specific doses of their medicine. This allowed it to develop a range of connected devices that address specific medicine-related needs. The company's core business unit still manufactures and sells its original products, and this generates recurring revenue. But it has also launched a new business, connected devices, for which the diabetes franchise is the top priority. Biocorp's strategy is to develop devices that can be used in conjunction with the existing products of pharma companies, thus keeping the pharma industry as its top client.

**Biocorp product ranges**


*Source: Biocorp*

### Smart devices for the digital era: Focus on using connected pens to improve compliance

Biocorp's transformation reflects changes in the broader diabetes market. While the disease is fairly well treated in terms of therapeutic solutions, much remains to be done when it comes to overall patient care. The necessary shift in the T2D market paradigm is already underway, and Biocorp's transformation is perfectly in step with it.

As described in previous chapters, the T2D market is being held back by specific factors:

- Screening is imperative, since an estimated 46% of diabetics are undiagnosed and thus not on any kind of care programme;
- Major progress must be made on the compliance front as statistics show that just 37% of T2D patients are compliant, meaning 63% need to be converted to a solution that will improve this rate.

Players with different profiles are working on ways to improve the care pathway to optimise treatment and control disease progression. The most obvious solution, and the one that is gaining the most traction, is datamining. This is a modern solution. It can be based on a personalised and/or general approach and adapted to existing treatment methods. While data-based solutions will not revolutionise treatment, they do represent a disruption in terms of improving patient care and broadening the scope of action for pharma companies. The healthcare system is no longer limited to pharma cos contributing to patient health by developing drugs; now patients are providing those companies with data that can have a very significant impact at different levels of the healthcare system. In sum, the T2D paradigm is changing dramatically, shifting from a linear process (from pharma companies to patients) to an iterative one incorporating cycles of readjustment that reflect the natural evolution of the ecosystem as a whole.

Biocorp has been smart about recognising and capitalising on this paradigm shift. It has been able to carve out a place for itself in the new landscape and maintain its relations with its longstanding clients while at the same time gradually acquiring new skills and expertise to become a central player in the ecosystem. The device it developed, Mallya, connects physically to insulin pens and also digitally, to gather the essential data pharma cos need, notably to tackle the compliance issue that healthcare authorities and payers are increasingly focused on.

### Mallya, a universal device that can be used with all pens on the market

Mallya is a smart sensor designed for use with insulin pens. It automatically collects injection data (dose, date and time of day) and transfers it in real time to a treatment-monitoring mobile app via Bluetooth. Mallya is currently the only device available in its category labelled a CE medical device, class IIb (mark obtained in June 2019). The technology has been recognised on multiple occasions, notably winning three awards: Pharmapack Award 2016, Frost & Sullivan 2016 and CPhI Award 2017.

**The Mallya smart device**


*Source: Biocorp*

Mallya has characteristics that make it of interest to stakeholders across the diabetes care pathway (the four Ps: patients, physicians, pharma cos and payers). Patients are the biggest beneficiaries of the technology, but it holds advantages for treating physicians, pharma cos and payers as well. For patients, the technology features at least five characteristics that encourage:

- Compliance: Dosing accuracy is close to 100%, which is extremely important since it limits the risk of hypoglycaemia. This is because the insulin dose is estimated/calculated based on glycaemia recorded by the patient during a blood test (BGM or CGM). Risk of hypoglycaemia is the main reason why insulin-dependent diabetics hesitate to take insulin;
- Adherence: Transparency of use, visual and auditory signals, easy pairing and reporting history for each injection. These characteristics make the insulin pen simpler to use. Adherence is thus likely to improve sharply, as patients will be more comfortable using the system and data is transmitted easily and immediately, relieving patients of a fastidious aspect of treatment management.

**Advantages of Mallya for each of the "4P" stakeholders (patients, physicians, pharma companies, payers)**

| Mallya features | Patient | Physician | Pharma | Payer |
|---|---|---|---|---|
| Removable and reusable for two years | ✓ | | ✓ | |
| Compatible with all pen injectors, disposable and reusable | | | ✓ | |
| Totally transparent for patients (use, dosage entry, injection) | ✓ | | | |
| Automatic collection of selected doses with near 100% accuracy | ✓ | ✓ | ✓ | ✓ |
| Real-time data transfer via Bluetooth | | ✓ | ✓ | |
| Record of each injection: dose delivered, type of insulin, date and time | ✓ | ✓ | ✓ | ✓ |
| Visual and audio signals to guide patients during injection | ✓ | | | |
| Customisable: additional functionalities optional | ✓ | | | |
| Effortless pairing with smartphones | ✓ | | | |
| High interoperability with existing platforms and digital solutions | | | ✓ | ✓ |

*Source: Biocorp (list of strengths), Gilbert Dupont (benefits for the 4 Ps)*

Another positive for Mallya is that the technology is universal, meaning it can be used not only with all insulin pens but also with several platforms and digital solutions. This flexibility gives Biocorp a wide range of opportunities to work with companies that make injectable insulin and others not involved in insulin. The company unveiled a first version of its pen injector-compatible device late in 2016, for use by people with chronic conditions including diabetes or Parkinson's, or treated with growth hormones. After developing its own connected injection devices, the company quickly got to work on removable devices that could be adapted to the disposable pens already on the market with no modifications. Biocorp is a pioneer in this field and one of only a handful of players offering this type of product. This differentiating factor is all the more important if we consider that disposable pens make up 90% of the market. The fact that Mallya can be adapted to the pens currently on the market, with no modifications required, combined with its 100% accuracy, give Mallya a solid and lasting place in the injection device market. It should be recalled that Mallya is removable and can be reused for two years.

### Interest in the product is translating into significant revenue: First deal with Sanofi

Biocorp announced in July 2019 that it was in talks with Sanofi about expanding their collaboration. In December of that year, the two companies announced a long-term agreement to use Mallya with Sanofi's

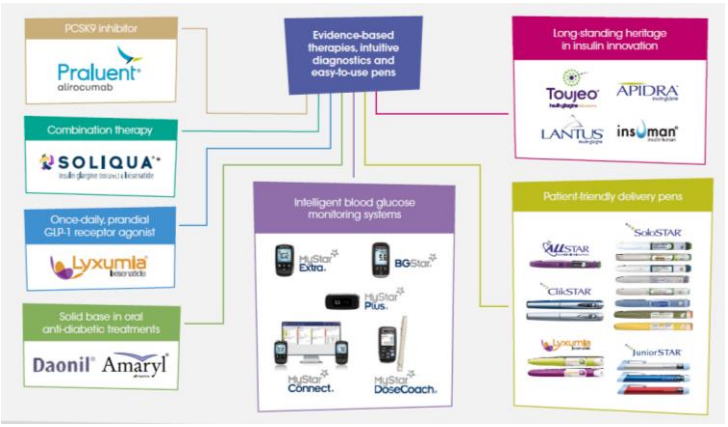
SoloStar insulin pen range. The deal called for Biocorp to receive an upfront payment and milestones in addition to revenue generated by production of the device on behalf of Sanofi, which will market a pen with Mallya embedded in it across the globe:

- €5m upfront payment received in 2019;
- €1m more paid early in 2020;
- Remaining €14.5m to be paid in instalments in 2020 and 2021.

This first partnership with Sanofi is a long-term one, suggesting that Biocorp will scale up quickly to meet the needs of its current partner and accept orders from other companies it could join forces with later. For now, Biocorp is planning to hire about 15 new people and to invest €1m to add a new assembly line for the Mallya devices made for Sanofi.

By combining the two technologies, Biocorp and Sanofi aim to offer T2D patients the most effective system in the market for monitoring and tracking their disease, the only one that delivers 100% accuracy. The smart sensor inside the device records the dose of insulin taken when the patient uses a SoloStar pen. This data can also be combined with the glycaemia rates recorded on Sanofi's digital monitoring platform, which currently includes the MyStar DoseCoach blood glucose meter and the My Dose Coach smartphone app. By adding Mallya to its pens, Sanofi is providing patients, and by extension the other three Ps, with a digital ecosystem that facilitates tracking care and disease progression over the long term. It will be easier for patients to monitor their insulin, knowing that their glycaemia is affected by their lifestyle, diet and physical activity. The DoseCoach platform can also suggest adjustments to insulin dosage thanks to a titration algorithm recommended by treating physicians.

**Sanofi products: Lantus blockbuster drug and SoloStar pen**




Long-standing heritage in insulin innovation

| Product | About the product |
|---|---|
| Toujeo® | Toujeo® (insulin glargine 300 Units/mL) is a once-daily basal insulin, that is available in more than 60 countries. Toujeo® is a long-acting human insulin analog indicated to improve glycemic control in adults with diabetes mellitus.[1] |
| Lantus® | Lantus® (insulin glargine 100 Units/mL) is a long-acting basal insulin analog that provides a slow, steady release of insulin and helps manage blood sugar between meals, and overnight.[2] The cornerstone of Sanofi's diabetes portfolio, Lantus has helped more than 10 million people with diabetes over 89 million patient-years since launch, in more than 130 countries. |
| Insuman® | Insuman® (human insulin 100 IU/mL) includes a range of rapid and intermediate human insulin solutions and suspensions for injections. Insuman is used in patients with diabetes who need treatment with insulin.[3,4] |
| Apidra® | Apidra® (insulin glulisine injection) is an add-on to basal insulin in basal-bolus regimen. Apidra is indicated for the treatment of adults, adolescents and children, six years or older with diabetes mellitus, where treatment with insulin is required.[5] |

*Source: Sanofi*

It is worth noting that the deal with Sanofi was reached during Sanofi's global strategy review. Paul Hudson took over as CEO in September 2019 and conducted the usual portfolio and strategy reviews. One of his most important decisions was to break with tradition and halt R&D in the field of diabetes. This led Sanofi to withdraw from Onduo, the JV set up in 2016 with Google (Verily, formerly Google Life Sciences). Each partner had invested $248m to roll out this "virtual clinic" to remotely care for diabetic patients. It was Hudson's view that Sanofi had "overinvested" in Onduo. Sanofi still owns a stake in the JV but is no longer involved in operations. Hudson estimated that the diabetes projects undertaken were not transformative or disruptive enough for payers and doctors. The fact that the Biocorp deal was announced while this review was underway shows just how interested Sanofi is in Mallya and the device's ability to maintain and even accelerate growth in Sanofi's diabetes franchise.

In February of 2019, Biocorp entered into a partnership with AgaMatrix, to which it gave non-exclusive distribution rights for Mallya in the US, UK, and European diabetes markets. AgaMatrix also got exclusive rights to license and distribute the device in the US white label market. In addition, the two companies will work together to develop breakthrough solutions combining their respective expertise. Biocorp estimates that this collaboration could generate up to €20m of sales over five years. The companies have yet to disclose the terms of the deal.

**Biocorp has opportunities with makers of insulin injectors…**

In France, it is currently possible to buy about 30 insulin products made by three pharma companies: Lilly, Novo Nordisk and Sanofi. The products can be divided into four categories:

- Rapid-acting insulins;
- Long-acting analogue insulins;

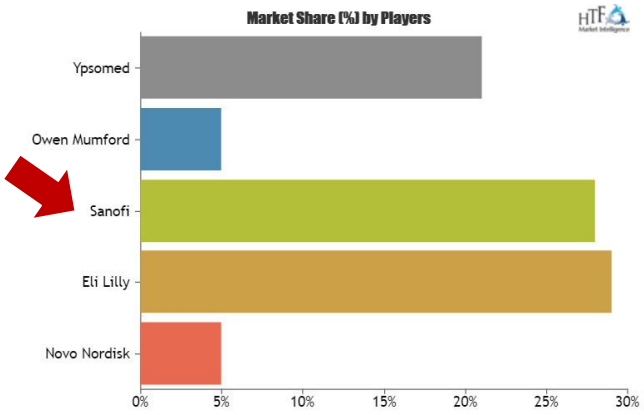
- Intermediate-acting insulins;
- Mixed insulins.

Some types of insulin last longer, and some act more rapidly. A specific type will be prescribed based on the desired effect, when the dose is taken (outside of or after meals) and how it is administered. Insulin is given either through injection (pen or needle) or an insulin pump (wearable or implantable) to deliver insulin continuously. Nearly all types of insulin come in the form of:

- Injectable pens or needles;
- Cartridges;
- Vials.

Thanks to the multitude of types of insulin and brands on the market, treatment can be adapted to individual patients based on their clinical condition, age, weight, height, lifestyle, etc. A study conducted by HTF Market Intelligence showed that insulin pen sales in the ten main markets (10 MM) are likely to climb above $14bn by 2025. The main players offering products and services and continuously developing solutions are Novo Nordisk, Eli Lilly, Sanofi, Owen Mumford, Ypsomed and Biocon Ltd.

**Breakdown of insulin pen market**

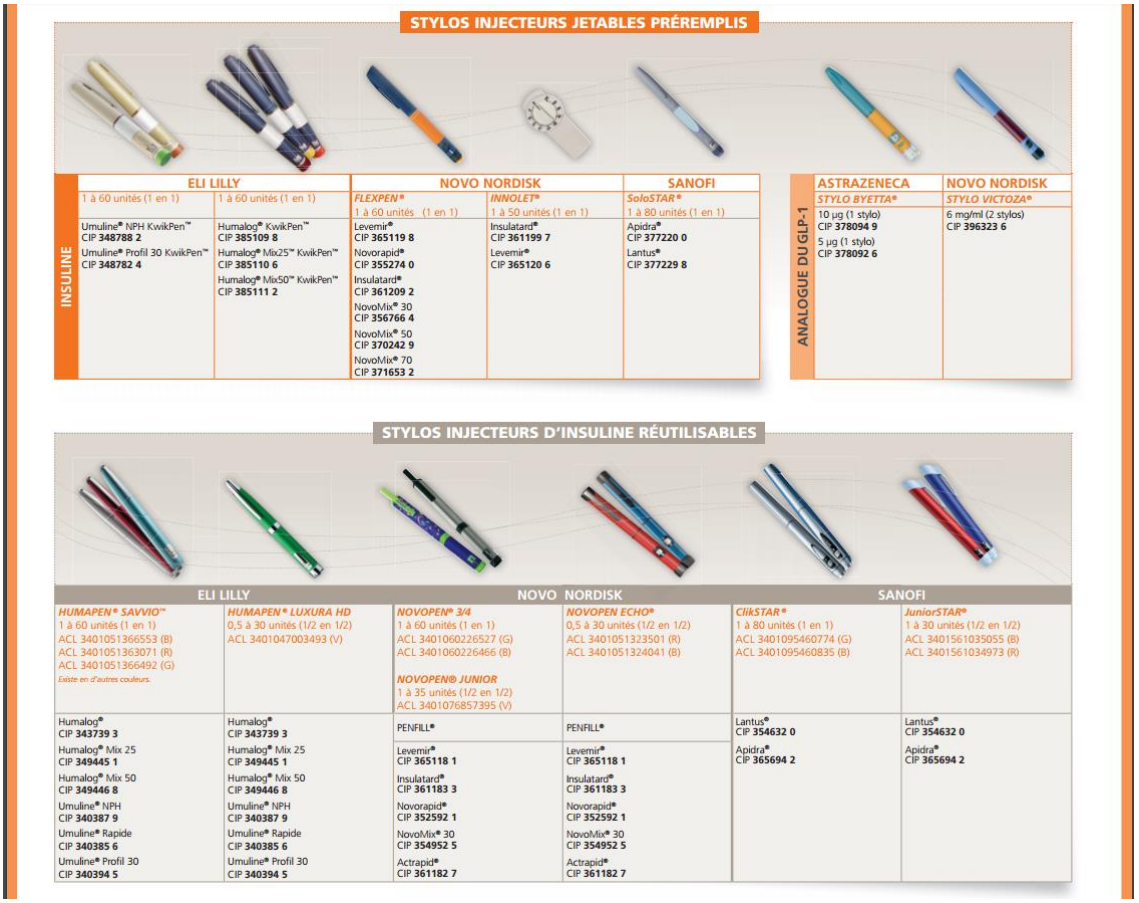



*Source: HTF Market Intelligence*

According to this same report, Germany accounted for 15% of the global insulin pen market in 2017, and China was the biggest market for reusable ones. Reusable insulin pens make up the largest share of the global insulin pen market in volume terms, making China the main growth driver for injection pens for diabetics. Yet forecasts suggest that disposable pens will grow faster in value terms in 2018-2025. Asia will be a key source of growth since Japan is the third largest market for insulin pens, and is by itself the second largest T2D market after the US/Europe. Currently, the leading insulin pen brands are Flexpen (Novo Nordisk), SoloStar (Sanofi) and KwikPen (Eli Lilly). The fact that Sanofi's SoloStar pen ranks among the leaders bodes well for Biocorp and its long-term collaboration with the pharma co on the SoloStar range.

The graph above shows the breakdown of the insulin pen market. If we remove Ypsomed and Owen Mumford, which make pens but not insulin (or any medicine), we are left with the three market leaders: Sanofi, Eli Lilly and, to a lesser degree, Novo Nordisk. These companies together control 62% of the insulin pen market. Biocorp's first deal with Sanofi for the SoloStar range gives an idea of Mallya's growth potential just with this deal alone. Insofar as Mallya can be adapted for use with all insulin pens on the market (it takes very little to customise them), the opportunities should be quite substantial going forward. Nor can we rule out partnerships with pure pen makers, which in our view could hold real growth potential for Biocorp since these companies want to boost market penetration of their products by adding a differentiating feature, such as a connected system. These types of partnership hold two advantages for distributors: 1/ their positioning improves when a connected device is added to their range of pens, and 2/ data sales create a new source of revenue for them.

**Non-exhaustive overview of the disposable insulin pens on the market**




*Source: BD*

### … and many more opportunities outside the diabetes market

The insulin pen market alone holds immense potential for Biocorp, but we see opportunities for it in other areas as well. Within the diabetes market, players other than makers of insulin pens could see a benefit to collecting data from their own devices. Mallya digitally measures insulin doses to be injected, but the same technology can be used to gather data from tests. Insulin-dependent diabetics must perform two critical and complementary tasks to manage their disease: blood tests to measure glycaemia and insulin injections, with doses calculated based on glycaemia. It is possible to gather useful data accurately and reliably at these times. This makes the entire range of BGM systems with lancets a potential opportunity for Biocorp.

While the Biocorp name is currently associated with diabetes care, it also has many opportunities in other spaces. Indeed, any type of substance that needs to be injected in very precise doses, or that requires a high degree of traceability, can benefit from Biocorp's technology:

- Hormone therapy: growth hormones, fertility treatments, hypothyroidism treatment… these applications require injections over long periods with very precise dosing. Biocorp's solutions meet all the relevant criteria;
- Neurology: regular injections can be part of Parkinson's care. As the disease is caused by the body gradually producing less dopamine, it can in some cases be treated with dopamine injections. Parkinson's is thus another area in which, like for hormone therapy, Biocorp's solutions could help patients get better care since this is a field where medicine-taking support is especially useful. In September of 2016, Biocorp formed a partnership with Aguettant to use Mallya in conjunction with Apokinon, Aguettant's apomorphine self-injection pen. The goal was to improve patient care and the management of ambulatory treatment by apomorphine by connecting the patient to the healthcare professionals involved in their treatment;
- Opioids: administration of opioids in inpatient settings requires a very high level of delivery traceability (morphine and other injectable drugs…). Use of these drugs is very tightly controlled and they are kept under lock and key with strict rules on who is authorised to handle and administer them. A system like Biocorp's could facilitate traceability in terms of delivery quantities, dates and times. This digitalisation of data, together with restrictions on access, could allow hospitals to manage their supplies more carefully and with a high degree of traceability.

### Competitive landscape for Biocorp

Biocorp is part of a vast ecosystem yet its competition is limited. Many companies with complementary profiles are active in diabetes treatment, but their expertise is often limited to a very specific area, so they face little direct competition. This is true of Biocorp, which only has one direct competitor today: Diabnext, a company whose platform includes three complementary solutions for insulin-dependent patients:

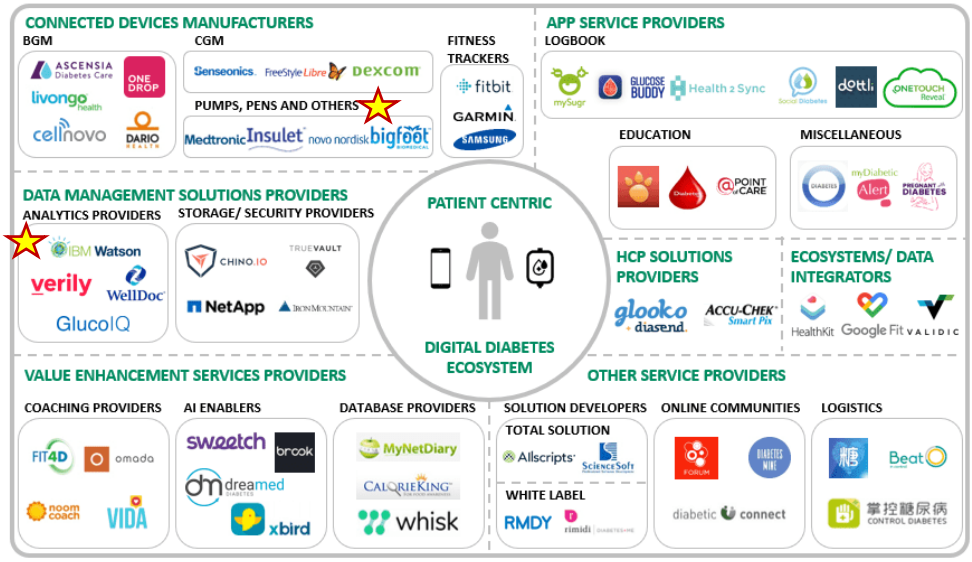
- Clipsulin: like Mallya, this device can be attached to most insulin pens (all products in the Eli Lilly, Novo Nordisk and Sanofi ranges). The system analyses the sound and vibration of the wheel of the pen and sends the data to the cloud. Given how it works, we assume it is not as reliable as Mallya;
- Gluconext: this device connects physically to a glucose meter via an audio jack and sends the data gathered to the smartphone. A model with an infrared transmitter is also available. Depending on the connection mechanism, Gluconext can adapt to many glucose meters from different manufacturers (Roche, Abbott, Ascensia, Lifescan, Acon, Trividia, Fora, I-sens and Bionime);
- Snapcarbs: this is a mobile app that can be used to snap a photo of a meal and estimate the carbs it contains almost instantaneously to help T1D patients manage their diet and sugar intake.

**- Solutions developed by Diabnext**


*Source: Diabnext*

In 2017, Diabnext indicated that Sanofi was using one of Diabnext's two patents on systems for recovering data from insulin pens to develop its own device. Sanofi's move to draw closer to Biocorp and the recent deal to expand the use of Mallya with the SoloStar pen suggests that this plan was scrapped. Here again, Mallya delivered unparalleled precision in insulin dose delivery at an affordable price (€40 to €50 per unit). In 2017, Diabnext planned to market its device for €79 ($39.99 launch price if pre-ordered) plus €99 a year for extra services not included with the free functionalities offered on the Diabnext platform.

**The most representative segments of the digital diabetes treatment market (2018)**




*Notes: 1. The list is only indicative of some key players in each segment and not exhaustive, 2. A single company could be present in more than one segment*

*Source: Research2Guidance (stars = Biocorp's positions)*

In broader terms, Biocorp operates in a very rich ecosystem in which every player has specific expertise. Most are pure players, since digital and AI are very technical areas that require strong franchises and real agility to keep up with changes not only in technologies but also in needs and the competitive landscape. Biocorp falls into the "connected devices manufacturers" category, especially "pumps, pens and others". This may be the positioning that best characterises it today, but Biocorp could also be identified as an analytics provider in the "data management solutions" category. As it stands, Biocorp has leeway to move into other segments of the digital industry thanks to its technological expertise and the sophistication of its algorithms and digital environments. We nonetheless believe that if players in this ecosystem want to remain on the cutting edge and stand out from the competition, they need to avoid spreading themselves too thin and instead stay focused on a few areas of expertise. By adopting an incremental strategy designed to expand and support its existing services, Biocorp could pull ahead of its rivals and become a major player in its field.

**Strategic digital partnerships bolstering the company's positions**

Since it began its shift toward digital solutions in 2013, Biocorp has forged alliances with three companies to establish Mallya as a complementary and reliable tool for collecting data:

- iSage Rx in February 2020: the two companies joined forces to integrate their technologies to simplify insulin dose capture and optimisation: CE marked device for insulin pens + clinically validated and FDA-cleared insulin titration platform. Diabetic patients will be able to record and store information about their insulin injections while receiving automated guidance on how to adjust doses over time (titration).
- DreaMed in February 2019: Mallya enhances the DreaMed Advisor Pro solution by providing data on daily insulin injections. Applying adaptive learning, Advisor Pro refines its understanding of each patient and sends recommendations to their healthcare provider on how to optimise insulin pump settings for basal rate, carbohydrate ratio and correction factor. DreaMed plans to expand the capabilities of DreaMed Advisor to include decision support tools for healthcare professionals treating diabetic patients with basal or multiple daily injections therapy.
- AgaMatrix in February 2019: in addition to a non-exclusive partnership for marketing rights to Mallya, the partners are working to co-develop an innovative diabetes treatment solution combining both companies' devices and expertise. AgaMatrix develops innovative solutions for monitoring glycaemia and managing data on mobile platforms and the cloud. It has sold more than 8m glucose meters and more than 3bn test strips since it was founded in 2001.
- Keynae in December 2014: spun off from Orange in 2013, Keynae specialises in data encryption and processing. Biocorp acquired the company in December 2014 to guarantee the security of the data collected through its devices.

These partnerships have solidly anchored Biocorp within the digital diabetes management market, applying what we would call a vertical incremental strategy (increasing expertise in its own franchise) vs. horizontal incremental (expansion into different franchises). This strategy has allowed it to remain a leader and to stay competitive in its field, always offering cutting-edge expertise. A horizontal approach dilutes expertise, but also allows companies to gain footholds in different segments and achieve a degree of diversification that can boost staying power. Given Biocorp's size and a business model that includes the core manufacturing activity, we believe the vertical strategy is the best option for the company and the one that can create the most value at this stage. It is nonetheless possible that Biocorp will explore other aspects of the digital ecosystem over the medium term, once Mallya is solidly established.

# Valuation

### Estimates for the Manufacturing & Others business unit

Biocorp's core activities are housed in its Manufacturing & Others business unit (BU). The BU designs products specifically for its clients: key accounts in the pharmaceutical industry. It may deliver simple packaging solutions or more complex, connected products: dosage systems (e.g. spoons, pipettes, droppers), dispensing systems (e.g. cannulas, mouthwashes, dosing caps) or plastic parts, such as accessories for pre-filled syringes (e.g. backstops, needle shields, connectors).

Biocorp has also acquired expertise in connected devices and can tailor them to its clients' needs, covering all stages of the value chain from prior art research to the development of functional prototypes. It can customise solutions based on its existing technology platform and products (Datapen, Mallya, Inspair, Biopass, Carpseal, etc.), or build them *de novo* to user specifications. Biocorp has people with a wide range of complementary skills on staff, specialising in electronic and mechanical engineering, software design, moulding and plastic injection. This approach applies mainly to simple components, reconstitution systems or drug delivery systems. Biocorp supports its clients and their projects throughout the development industrialisation processes.

Our model assumes that the Manufacturing & Others BU will deliver growth of around 4% over the coming years, as Biocorp has long-term relationships with its partners. Since its production lines are up and running, we have applied a WACC of 9%, knowing that the company is not very dependent on this largely autonomous BU.

### Sales estimates for Mallya

To assign a value to Mallya, we have for now only taken into account Biocorp's existing production capacity, which is the main factor holding back our valuation. While we are certain that the Mallya technology is of interest to and has benefits for the industry, the production chain has a physical capacity that cannot be exceeded. Our estimates for the short and medium terms are thus conservative as we assume that the deal with Sanofi will use up all of Biocorp's production capacity. That being said, our model factors in a scaling up this year, per management's plan to lift capacity from 60k units currently to 400k by the end of 2020. We assume that capacity will subsequently increase to 900k in 2022, and apply this figure to the remainder of the forecast period, though management could decide to scale up further over the medium term, notably if it lands new contracts of comparable size to the one with Sanofi.

There are currently more than 60m diabetics in the world who use insulin pens. It is estimated that nearly 20m patients were taking a Sanofi insulin in 2018, with about half taking Lantus, its blockbuster drug. If we assume that Biocorp could produce 400k Mallya devices a year, and that they last two years, then Biocorp could address 800k people taking one of the insulins injectable with a SoloStar by year N+1, i.e. by 2021.

As regards pricing, we have considered an average selling price for Mallya of €45, with a range of €40 to €50 per unit. The only benchmark available is Diabnext, which had said it would sell its device for €79 (introductory price of $39.99 if pre-ordered) and charge €99/year for extra services not included in the free functionalities on the Diabnext platform. The original price was announced in 2017, and we can assume that it would be lower today given the introduction of new products and, more importantly, current pricing pressure on medicines, especially for chronic diseases. In our view, €45 is a fair average price estimate given the level of sophistication of Mallya, the medical benefits provided, and the potential sales volumes to key accounts like Sanofi and AgaMatrix. As for the AgaMatrix contract, we have staggered the €20m of revenue from the deal over five years in a linear manner, as the details of the partnership have yet to be disclosed.

In terms of WACC, we take a more conservative approach than with the Manufacturing & Others BU, applying a WACC of 11% to 2020 and 2021 and then 13% for the following years. This factors in only the risk associated with the scaling-up already planned. The rate will be lowered as the scaling-up is completed and should reach 9% in 2023, by which time we believe Biocorp will have scaled up capacity to 900k units.

## Sales estimates for Mallya and growth estimates for the Manufacturing & Others BU

| Biocorp Market | Average price |
|---|---|
| | Mallya |
| France (EUR) | 45 |
| USA and WW (EUR) | 45 |

Sources : Company, Gilbert Dupont

**ESTIMATIONS / SIMULATIONS**

| MALLYA | 2017 | 2018 | 2019 | 2020e | 2021e | 2022e | 2023e | 2024e | 2025e | 2026e | 2027e | 2028e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Manufacturer | Biocorp | Biocorp | Biocorp | Biocorp | Biocorp | Biocorp | Biocorp | Biocorp | Biocorp | Biocorp | Biocorp | Biocorp |
| **Production capacity** | | | 60 000 | 100 000 | 400 000 | 900 000 | 900 000 | 900 000 | 900 000 | 900 000 | 900 000 | 900 000 |
| Production capacity (K unités) | | | 60 | 100 | 400 | 900 | 900 | 900 | 900 | 900 | 900 | 900 |
| **Revenues from AgaMatrix (M€)** | | | | **4** | **4** | **4** | **4** | **4** | | | | |
| **Revenues from Sanofi (M€)** | - | - | **5** | **13** | **26** | **41** | **36** | **36** | **9** | **9** | **7** | **7** |
| *Upfront / Milestones* | | | 5 | 8 | **8** | | | | | | | |
| *Sales* | - | - | - | 5 | 18 | 41 | 36 | 36 | 9 | 9 | 7 | 7 |
| **Production sold (units)** | | **-** | **-** | **100 000** | **400 000** | **900 000** | **800 000** | **800 000** | **700 000** | **700 000** | **750 000** | **750 000** |
| *AgaMatrix* | - | - | - | - | - | - | - | - | - | - | - | - |
| *Sanofi* | | | | *100 000* | *400 000* | *900 000* | *800 000* | *800 000* | *200 000* | *200 000* | *150 000* | *150 000* |
| *Others partners* | | | | | | | *100 000* | *100 000* | *700 000* | *700 000* | *750 000* | *750 000* |
| **Average price (EUR)** | | **45,00** | **45,00** | **45,00** | **45,00** | **45,00** | **45,00** | **45,00** | **45,00** | **45,00** | **45,00** | **45,00** |
| Sales from AgaMatrix (M€) | | - | - | 4,00 | 4,00 | 4,00 | 4,00 | 4,00 | - | - | - | - |
| Sales from Sanofi (M€) | | - | - | 4,50 | 18,00 | 40,50 | 36,00 | 36,00 | 9,00 | 9,00 | 6,75 | 6,75 |
| Sales from other partners (M€) | | | | - | - | - | 4,50 | 4,50 | 31,50 | 31,50 | 33,75 | 33,75 |
| **TOTAL** | | **-** | **-** | **8,50** | **22,00** | **44,50** | **44,50** | **44,50** | **40,50** | **40,50** | **40,50** | **40,50** |

| BU MANUFACTURING & OTHERS | 2017 | 2018 | 2019 | 2020e | 2021e | 2022e | 2023e | 2024e | 2025e | 2026e | 2027e | 2028e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Revenues** | **2,32** | **3,89** | **3,45** | **3,58** | **3,73** | **4,18** | **4,35** | **4,51** | **4,69** | **4,88** | **5,08** | **5,29** |
| Sales Goods | **0,00** | - | - | - | - | - | - | - | - | - | - | - |
| Sales Tools | **0,28** | **1,03** | **0,00** | - | - | **0,30** | **0,30** | **0,30** | **0,30** | **0,30** | **0,30** | **0,30** |
| Sales traditional products | **1,63** | **1,74** | **1,76** | **1,87** | **1,98** | **2,10** | **2,22** | **2,35** | **2,50** | **2,65** | **2,80** | **2,97** |
| Provision of services (without Mallya) | **0,40** | **1,13** | **1,68** | **1,72** | **1,75** | **1,79** | **1,82** | **1,86** | **1,90** | **1,94** | **1,97** | **2,01** |
| *Growth* | | *67,6%* | *-11,4%* | *3,9%* | *4,1%* | *12,2%* | *3,9%* | *3,9%* | *4,0%* | *4,0%* | *4,0%* | *4,1%* |

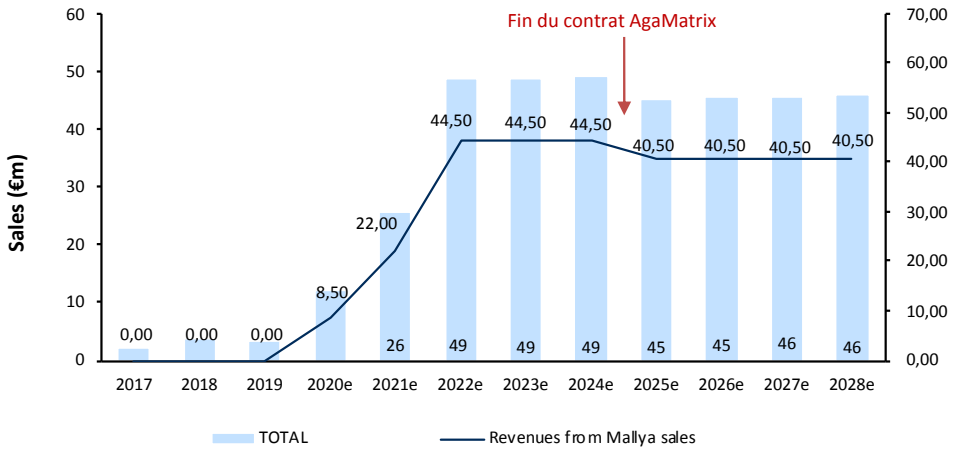
**SYNTHESIS**

| | 2017 | 2018 | 2019 | 2020e | 2021e | 2022e | 2023e | 2024e | 2025e | 2026e | 2027e | 2028e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Revenues from BU Manufacturing & others** | **2,321** | **3,890** | **3,448** | **3,584** | **3,730** | **4,184** | **4,345** | **4,515** | **4,693** | **4,881** | **5,079** | **5,286** |
| *% of total revenues* | *100%* | *100%* | *100%* | *30%* | *14%* | *9%* | *9%* | *9%* | *10%* | *11%* | *11%* | *12%* |
| **Revenues from Mallya sales** | **0,00** | **0,00** | **0,00** | **8,50** | **22,00** | **44,50** | **44,50** | **44,50** | **40,50** | **40,50** | **40,50** | **40,50** |
| *% of Mallya revenues from AgaMatrix* | | | | *47%* | *18%* | *9%* | *9%* | *9%* | *0%* | *0%* | *0%* | *0%* |
| *% of Mallya revenues from Sanofi and others partners* | | | | *53%* | *82%* | *91%* | *81%* | *81%* | *22%* | *22%* | *17%* | *17%* |
| *% of total revenues* | *0%* | *0%* | *0%* | *70%* | *86%* | *91%* | *91%* | *91%* | *90%* | *89%* | *89%* | *88%* |
| **TOTAL** | **2,321** | **3,890** | **3,448** | **12,084** | **25,730** | **48,684** | **48,845** | **49,015** | **45,193** | **45,381** | **45,579** | **45,786** |

*Source : Gilbert Dupont*

Our revenue forecasts are based on market assumptions for each partner, the terms of each partnership, Biocorp's projected production capacity, and the inherent cost of developing the products in question. We have also assumed an average taxation rate of 25% (range of 15-30%). This model suggests that cumulative peak sales of €49m will be reached in 2024, not counting any potential new partnerships.

### GD estimates: Total revenue vs. sales generated by Mallya

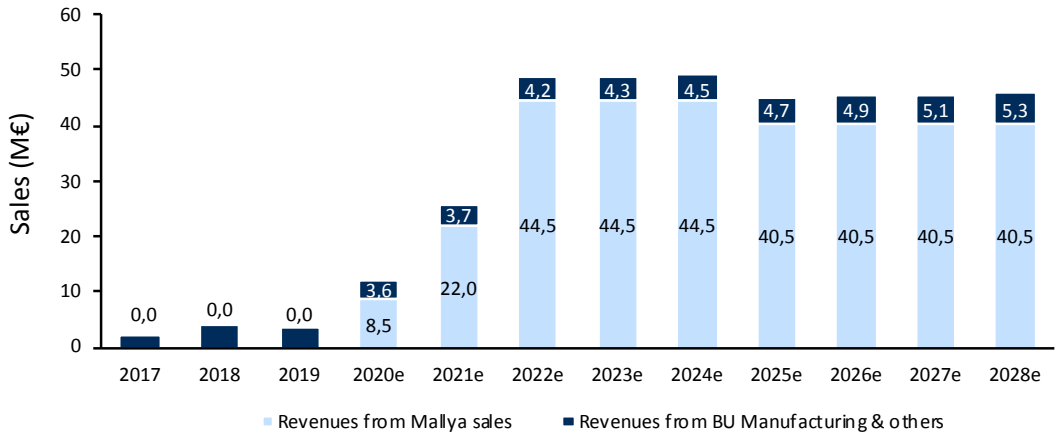



*Source: Gilbert Dupont*

### Buy, TP of €26.9 (DCF)

We have calculated the value of Biocorp using a DCF approach, based on the DCF value of the Manufacturing & Others BU, which has been growing at a steady rate for several years, and the DCF value of Mallya, which can be expected to contribute the lion's share of revenue going forward. Our model factors in continued steady growth for the Manufacturing & Others BU and stronger growth for Mallya, which we estimate will account for 90% of Biocorp's sales two years from now.

**Ratio between revenue from the Manufacturing & Others BU and Mallya**




*Source: Gilbert Dupont*

Taking all of this into account, we are initiating coverage of Biocorp with a Buy rating. Our fair value estimate of €150.4m reflects the risk associated with the fact that our revenue models are based on a scaling-up that has yet to be completed. That being said, the contract with Sanofi increases the probability of success of our revenue model in the near term. We have therefore applied a PoS of 90% for this year, 80% for 2021 and 75% for the following years. We will raise the PoS if new large partnerships are announced, as industrial firms like Sanofi tend to only commit to long-term collaborations if they have a degree of certainty that their partners will be able to fulfil their contract.

**DCF model for Biocorp**

| | 2018 | 2019 | 2020E | 2021E | 2022E | 2023E | 2024E | 2025E | 2026E | 2027E | Perpetuity |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Sales | 3,988 | 8,632 | 20,181 | 33,328 | 48,781 | 48,943 | 49,113 | 45,291 | 45,479 | 45,676 | 45,884 |
| *sales growth %* | *66%* | *116%* | *134%* | *65%* | *46%* | *0%* | *0%* | *-8%* | *10%* | *5%* | *1,5%* |
| EBIT | 3,345 | 7,879 | 18,826 | 29,261 | 40,648 | 31,813 | 31,923 | 31,704 | 31,835 | 31,973 | 32,119 |
| *% of sales* | *84%* | *91%* | *93%* | *88%* | *83%* | *65%* | *65%* | *70%* | *70%* | *70%* | *70%* |
| Tax | (0,197) | 1,594 | (2,824) | (7,315) | (12,194) | (9,544) | (9,577) | (9,511) | (9,551) | (9,592) | (9,636) |
| Amortization & depreciation | 0,889 | 0,689 | 0,893 | 0,689 | 0,893 | 0,689 | 0,893 | 0,689 | 0,893 | 0,689 | 0,893 |
| *% of sales* | *22%* | *8%* | *4%* | *2%* | *2%* | *1%* | *2%* | *2%* | *2%* | *2%* | *2%* |
| **Operating Cash flows** | **4,036** | **10,163** | **16,895** | **22,635** | **29,347** | **22,958** | **23,239** | **22,882** | **23,178** | **23,071** | **23,376** |
| Capex | (0,822) | (1,002) | (1,659) | (1,159) | (2,159) | (1,450) | (1,489) | (1,530) | (1,573) | (1,618) | (1,665) |
| *% of sales* | *-21%* | *-12%* | *-8%* | *-3%* | *-4%* | *-3%* | *-3%* | *-3%* | *-3%* | *-4%* | *-4%* |
| Δ in WCR | (0,000) | (0,000) | (0,000) | (0,000) | (0,000) | (0,000) | (0,000) | (0,000) | (0,000) | (0,000) | (0,000) |
| Chg. in other assets & liabilit | 0,114 | (0,051) | 0,005 | 0,005 | 0,005 | 0,005 | 0,005 | 0,005 | 0,005 | 0,005 | 0,005 |
| **Free cash flow** | **3,328** | **9,110** | **15,241** | **21,481** | **27,192** | **21,513** | **21,755** | **21,357** | **21,610** | **21,458** | **21,716** |
| **Discounted Cash Flow** | **3,053** | **7,667** | **11,556** | **14,674** | **16,439** | **11,509** | **10,300** | **8,948** | **8,012** | **7,041** | **61,959** |
| Calculated WACC | 9,00% | 9,00% | 11,00% | 11,00% | 13,00% | 13,00% | 13,00% | 13,00% | 13,00% | 13,00% | 7,00% |
| PoS | 100% | 100% | 90% | 80% | 75% | 75% | 75% | 75% | 75% | 75% | 75% |

| | |
|---|---|
| ∑ FCF | 88,480 |
| Terminal Value | 61,959 |
| **Enterprise Value** | **150,439** |
| **Risk adjusted Enterprise Valu** | **115,296** |
| Net debt | (3,622) |
| Minorities | 0,000 |
| **Equity Value** | **111,675** |
| Total number of share | 4,147 |
| **Share Price** | **26,93 €** |

*Source: Gilbert Dupont*

Based on these probabilities of success, our model puts Biocorp's EV at €115.3m, representing an equity value of €111.7m including net debt of €3.6m at the end of 2019, for a target price of €26.9. The model only factors in the deals with Sanofi and AgaMatrix for now. New partnerships would boost our valuation:

- Upfront and milestone payments could be negotiated;
- Sales estimates reflect the backlog and especially Biocorp's production capacity, and the actions it could take to meet its partners' requirements: construction of a new production plant and/or outsourcing to an as-yet-unidentified partner to increase production capacity without having to burn cash by investing in new capacity.

### Upside potential in the short and medium terms

The ramp-up of Mallya sales through the deal with Sanofi and future partnerships will be the main source of upside potential. It should be recalled that Biocorp is planning to scale up this year, boosting its annual output capacity from 60k units to 400k. This should accelerate sales for Mallya and drive revenue up over the coming years. We also believe this will allow Biocorp to enter into a second major partnership for Mallya to be distributed with a different insulin pen (injector or lancet).

Management is confident that it will be able to forge a partnership for Mallya with a pharma company that is a leader in the diabetes market, so our valuation could move up on the back of a deal locking in the revenue we anticipate via our PoS for the coming years. It could add about €1.85 to our valuation in the short term if we assume a PoS of 95% in 2020 vs. 90% currently, 90% vs 80% in 2021 and 80% vs 75% in 2022 (not counting any upfront or milestone payments). Indeed, we consider that a new partnership should secure the projected income estimatess for the coming years, Biocorp being recognized for its ability to form partnerships in a long-term way. However, the need to change scale to meet product delivery commitments means that we have to take a conservative position on PoS beyond a period of 3 years. Over the longer term, we expect to raise our TP by almost 90%, or €25.6, once annual production capacity reaches 1m units and the company has entered into at least one new partnership comparable in size to the Sanofi deal.

These potential upgrades to our TP take into account that our cash flow is modelled based on full capacity, so if a new partnership is announced, it would lead us to:

- Increase the PoS applied, as the deal would make it likelier for the projected revenue to materialise;
- Adjust our WACC, as the deal would increase the likelihood of a scaling up in the short/medium term;
- Potentially factor in higher income through upfront/milestone payments: a portion of the extra income would be invested in the scaling-up required.

Biocorp could also outsource manufacturing of Mallya to a partner to speed up production and allow new contracts to be signed before the company has reached the scale anticipated for 2023. This could meet Biocorp's needs once it has completed its scaling-up, depending on its deal flow and related capex. Such a decision would in turn increase the revenue potential from Mallya, possibly further boosting our valuation.

### Financial situation: €2m in cash at the end of 2019

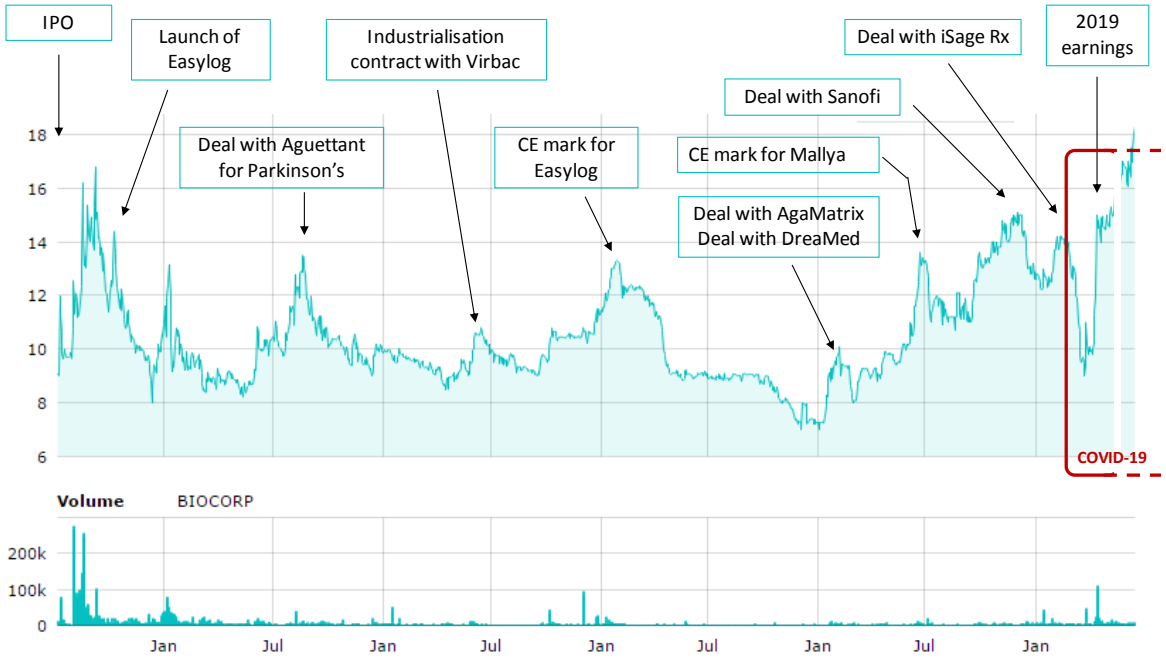
Biocorp made a profit in 2019, notably thanks to its expanded partnership with Sanofi. It also ended the year with €2m of cash after receiving €1m from Sanofi in January. Of the €20.5m negotiated with Sanofi, another €14.5m will be received this year and next, giving Biocorp financial security during the period when sales from Mallya are ramping up.

Since going public, the company has regularly tapped the market through private placements: it raised €8.9m in 2015 at the time of its IPO, before organising private placements that allowed it to raise €3.8m in 2016, €5m in 2018, and nearly €1m in 2019. Its gross average cash burn is close to €10m a year, or about €2.5m a quarter. We nonetheless expect it to burn cash more quickly over the coming years as it ramps up production capacity: we estimate that capex will increase by about €0.5m in 2020 and €1m in 2022 due to the scaling-up.

Biocorp ended 2019 with €6.8m of debt, of which €4.2m in loans and financial debt.

# Annexes

## Stock performance




Biocorp was floated on Alternext Paris in July 2015, and its share price has proved fairly resilient.
The stock is currently trading at above its IPO price (€9.25), which is only the case for a handful of healthtech companies listed in Paris.
Since the IPO, the price has averaged about €10. This is proof of resilience given that the going has been fairly rough for the healthcare sector since late 2017. The trading range has been relatively narrow, with the stock hitting a low of €7 in Q4 2018 and a high of €17 in Q3 2015. We attribute this consistency to a mixed business model that guarantees steady income and business continuity (thanks to the core Manufacturing & Others BU) while also creating speculative appeal as the company's innovations are leading to deals and a CE marks in the connected healthcare segment.

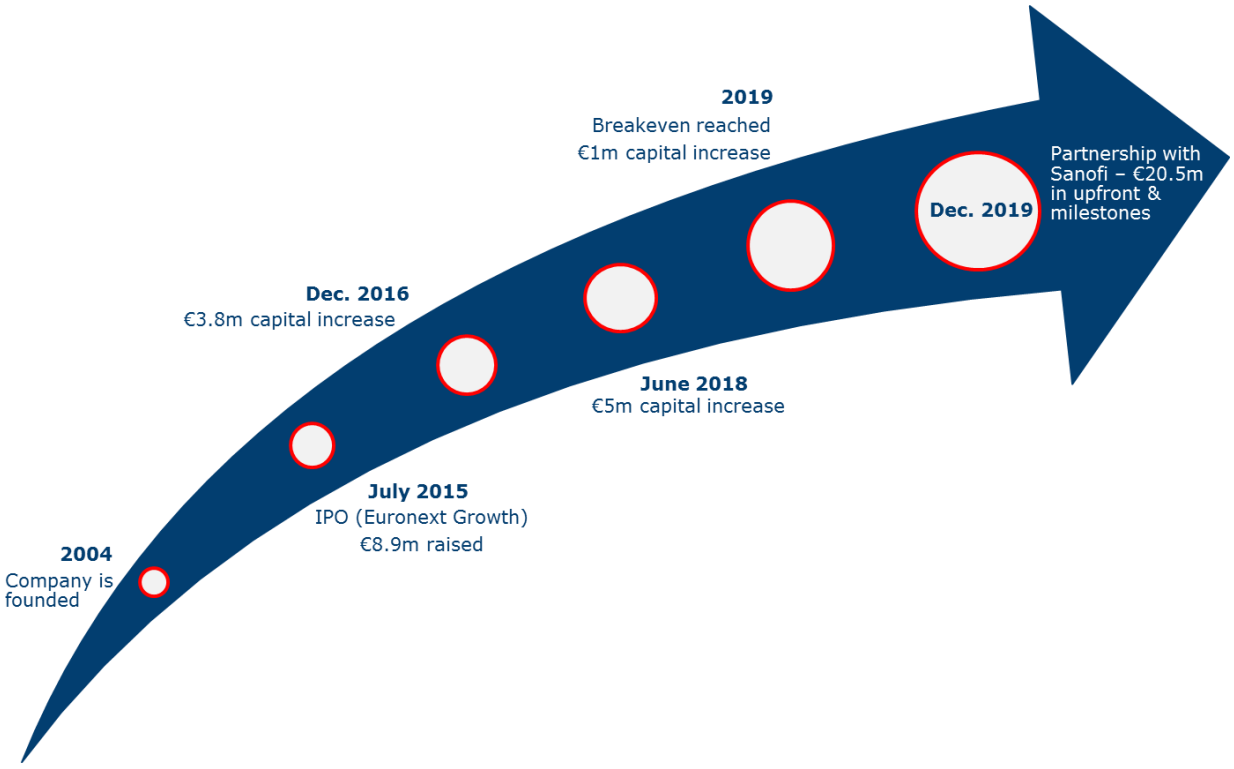
Equally remarkable is the fact that the stock gained 85% over one year from the record low hit in Q4 2018 and is about 170% higher today. We expect to see similar strong growth over the coming years, driven by a number of value-creating catalysts:

- Receipt of the remaining €14.5m of milestones from Sanofi in 2020 and 2021;
- Sales of Mallya with a significant ramp-up over the coming quarters and years;
- Contracts with new partners starting in 2020.

The only interruption to this upward trend is due to an external factor, the Covid-19 crisis, which has driven the share price down by 28%, from €14 to €10. This is broadly consistent with the declines of other stocks whose businesses have not been directly impacted by the public health crisis and its collateral effects, and with Biocorp's benchmark indexes: -27% for the CAC40 and -24% for the NextBiotech. The fact is that Biocorp's business model leaves it with little exposure to the negative impacts of Covid-19, which is why it has not been under excessive pressure or lost more ground than other stocks.

Otherwise, Biocorp has enjoyed very good momentum since 2019, with a first major deal with a leader in diabetes treatment validating its shift in focus to AI. Biocorp is also reaping the rewards of its outstanding results in 2019, when it reached breakeven and turned a profit for the first time. Over the course of the year, the company successfully executed several projects, penned new deals, earned awards recognising its expertise in connected healthcare, and validated its new business model. Investors applauded the company's FY earnings, with the stock shooting up by almost 50% even while the Covid-19 crisis was hitting the economy.

## History and key milestones



## Management

**Jacques Gardette – Chairman of the Board**
- An entrepreneur in the healthcare sector for more than 30 years, Jacques Gardette has created several companies specialising in the development, manufacture and distribution of medical devices.
- He founded Biocorp in 2004 in order to develop, produce and distribute a range of medical devices that improve adherence in patients treated for chronic diseases. In 2013, he decided to integrate information technologies into Biocorp products to deliver new and innovative solutions to patients and medical practitioners as well as pharmaceutical labs and third-party payers.

**Eric Dessertenne – CEO**
- Eric Dessertenne joined Biocorp in 2014, bringing with him experience and knowledge of the medical device market.
- Prior to that, he worked at Laboratoire Servier, in the corporate strategy department at the world HQ, before moving to the company's Chinese subsidiary in Beijing, where he held positions in the sales force effectiveness department.
- He also worked in the Pharmacy division of L.E.K Consulting.
- He holds a PhD in pharmaceutical sciences from Université de Clermont-Ferrand and an MBA from ESSEC in health and therapeutic innovation.

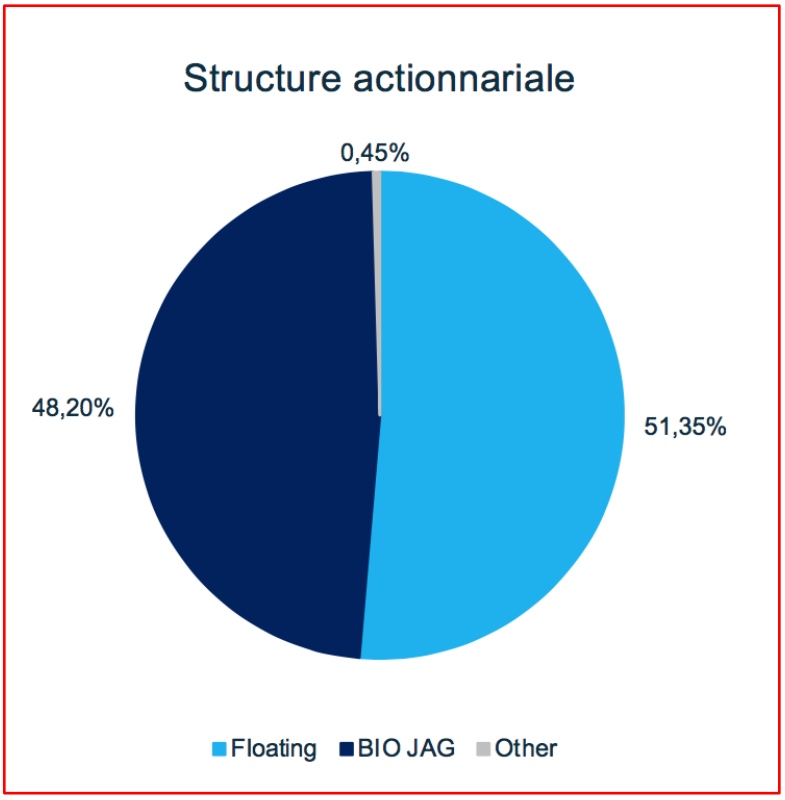
**Stéphane Chabanais – VP Finance**
- With a degree in corporate and business management from a technology university, Stéphane Chabanais began his career in 1986 as an accountant with Papeteries de la Couronne, and then moved on to La Reliure d'Art du Centre. He subsequently worked as head of accounting at BASTE SA for five years.
- For the past 17 years, Stéphane has been chief financial officer for the companies created by Jacques Gardette.

**Thierry Guillemaut – VP Manufacturing & Industrial Affairs**
- Thierry Guillemaut took over the helm of Biocorp's manufacturing facility in Issoire in 2010.
- He graduated from the CPF of Lyon with a BTS degree in plastics and composites and started his career at Rexam Cosmétique before moving in 1994 to Biodome, where he became head of manufacturing in 2004.

**Alain Marcoz – VP Innovation & Platform Development**
- In 2013, Alain Marcoz set up a specialised unit at Biocorp to manage large volumes of secure health data.
- He was previously IT director for the French branch of delivery firm TNT. He became an industrial project manager at Atos in 2006, and then served as director of the Atos agency in Clermont Ferrand in 2008 (150 people).
- In 2010, he created the "Confiance Numérique" service (50 people) at Almerys, a subsidiary of Orange Business Services, to secure the identity, transactions and personal data of users.
- Holding a master's degree in computer science, he began his career in industrial IT development.

- **Patrick Quero – VP Quality & Regulatory Affairs**
- Specialising in regulatory affairs in the medical device industry, Patrick Quero has expertise in several ISO standards.
- He joined Biocorp in 2016 to manage regulatory affairs and quality control.
- He worked as a chemist at Rhone Poulenc for five years, and then as a director at Quantel, first with the medical division (for 17 years) then at the laser business (7 years).
- He holds degrees from Université de Bretagne Occidentale and the IEQT in Vichy in biological and biochemical analyses and DESQ Quality.

## Shareholder structure




As of 30 June 2019, there were 4,146,988 ordinary Biocorp shares in issue with a nominal value of €0.05, of which 19,549 (0.47% of the capital) were held by the company. The articles of incorporation give double voting rights to shares that are fully paid up and registered to the same holder for at least two years.

| | Nombre d'actions existantes | % capital | Droits de vote | % des droits de vote |
|---|---|---|---|---|
| Jacques GARDETTE | 200 | 0.01% | 400 | 0.01% |
| BIO JAG | 1 998 800 | 48.20% | 3 997 600 | 65.00% |
| Famille Jacques GARDETTE | 1 000 | 0.02% | 2 000 | 0.03% |
| Actions auto-détenues | 19 549 | 0.47% | 19 549 | 0.32% |
| Flottant | 2 127 439 | 51.30 % | 2 130 054 | 34.64 |
| **TOTAL** | **4 146 988** | **100%** | **6 149 603** | **100%** |

# BIOCORP BUY

PEA SME

Jamila El Bougrini +33 (0) 1 40 22 55 88

| PRICE* | TP | POTENTIAL |
|---|---|---|
| € 21.60 | € 26.9 | +24.7% |
| *closing 19/06/20 | | |

## Activity

Biocorp develops connected solutions for insulin pens

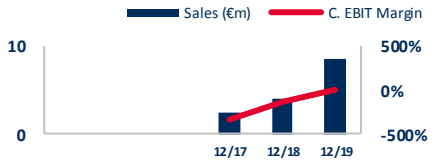
## Market data

| | |
|---|---|
| 12M Low/High | € 9.00/€ 21.60 |
| Volume (3M) | 8,713 shares/day |
| Number of shares | 4,146,988 |
| Market cap. | €m 90 |
| Free Float | €m 46 |
| Market | Euronext Growth |
| Sector | Life Sciences |
| Bloomberg | ALCOR FP |
| Isin | FR0012788065 |
| Index | CAC All shares |

## Shareholders on 31/12/19

| | |
|---|---|
| Free float | 51.4% |
| BIO JAG | 48.2% |
| Other | 0.5% |
| Employees on 31/12/19 | 60 |

## Sales and C. EBIT Margin




| PROFIT LOSS STATEMENT (€m) | 12/17 | 12/18 | 12/19 | 12/20e | 12/21e | 12/22e |
|---|---|---|---|---|---|---|
| Sales | 2.4 | 4.0 | 8.6 | 20.2 | 33.3 | 48.8 |
| Chg. | ns | 65.7% | 116.4% | 133.8% | 65.1% | 46.4% |
| Chg. lfl | nd | nd | nd | 250.5% | 112.9% | 89.2% |
| EBITDA | -4.4 | -4.3 | 1.6 | 11.3 | 21.5 | 32.5 |
| C. EBIT | -7.8 | -5.3 | 0.9 | 10.4 | 20.6 | 31.6 |
| EBIT | -7.8 | -5.3 | 0.9 | 10.4 | 20.6 | 31.6 |
| Net interest income | 0.0 | -0.3 | -0.2 | -1.0 | -0.6 | -0.9 |
| Tax | 0.4 | 0.3 | 0.2 | -1.4 | -5.0 | -9.2 |
| Income from associates | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Net earnings from discontinued operations | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Minority interests | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Net attributable profit | -7.5 | -5.3 | 1.0 | 8.0 | 15.1 | 21.4 |
| Adjusted net attr. profit | -7.5 | -5.3 | 1.0 | 8.0 | 15.1 | 21.4 |

| CASH FLOW STATEMENT (€m) | 12/17 | 12/18 | 12/19 | 12/20e | 12/21e | 12/22e |
|---|---|---|---|---|---|---|
| Cash Flow | -5.0 | -5.2 | 1.0 | 8.0 | 15.1 | 21.5 |
| - Chg. in WCR | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| - Capex | -0.3 | -0.4 | 0.5 | 0.3 | 0.3 | 0.3 |
| = Free Cash Flow | -9.3 | -6.1 | -1.8 | 5.3 | 10.5 | 13.8 |
| - Net financial investment | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| - Dividends | 0.0 | 0.0 | 0.0 | 0.0 | 1.0 | 2.0 |
| + Capital increase/Share buybacks | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| + Others | nd | nd | nd | nd | nd | nd |
| = Chg. net financial debt | 0.0 | -0.6 | 1.3 | 8.7 | 13.8 | 22.1 |

| BALANCE SHEET (€m) | 12/17 | 12/18 | 12/19 | 12/20e | 12/21e | 12/22e |
|---|---|---|---|---|---|---|
| Goodwill | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Other intangible assets | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 |
| Tangible assets | 1.8 | 1.3 | 1.5 | 1.5 | 1.5 | 1.5 |
| Financial assets | 0.3 | 0.2 | 0.4 | 0.3 | 0.3 | 0.3 |
| WCR | 1.6 | 1.5 | 1.9 | 0.7 | 1.3 | 2.2 |
| Shareholders' equity (group share) | -1.3 | -1.8 | 0.0 | 0.8 | 6.2 | 10.8 |
| Minorities | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Equity + minorities | -1.3 | -1.8 | 0.0 | 0.8 | 6.2 | 10.8 |
| Cash and equivalent | 0.7 | 1.3 | 2.0 | 10.0 | 25.1 | 46.5 |
| Net financial debt | 4.3 | 4.9 | 3.6 | -5.0 | -18.8 | -40.9 |
| Capital employed | | | | | | |

| PER SHARE DATA (€) | 12/17 | 12/18 | 12/19 | 12/20e | 12/21e | 12/22e |
|---|---|---|---|---|---|---|
| Number of shares (000) | 3,390 | 4,033 | 4,147 | 4,147 | 4,147 | 4,147 |
| Number of diluted shares (000) | 3,390 | 4,033 | 4,147 | 4,147 | 4,147 | 4,147 |
| Adjusted EPS | -2.21 | -1.32 | 0.23 | 1.94 | 3.63 | 5.17 |
| Reported EPS | -2.21 | -1.32 | 0.23 | 1.94 | 3.63 | 5.17 |
| CF per share | -1.47 | -1.29 | 0.24 | 1.94 | 3.63 | 5.17 |
| Book value per share | -0.37 | -0.45 | 0.01 | 0.20 | 1.50 | 2.61 |
| Dividend | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Payout | 0% | 0% | 0% | 0% | 0% | 0% |

| RATIOS | 12/17 | 12/18 | 12/19 | 12/20e | 12/21e | 12/22e |
|---|---|---|---|---|---|---|
| Gross margin/Sales | 80.2% | 81.4% | 31.2% | 53.2% | 65.0% | 83.1% |
| EBITDA/Sales | -183% | -107% | 18.4% | 56.2% | 64.7% | 66.6% |
| C. EBIT/Sales | -326% | -132% | 10.1% | 51.6% | 61.9% | 64.7% |
| EBIT/Sales | -326% | -132% | 10.1% | 51.6% | 61.9% | 64.7% |
| Corp. tax rate | 4.7% | 5.9% | -20.2% | 15.0% | 25.0% | 30.0% |
| Adjusted NR/Sales | -312% | -133% | 11.1% | 39.8% | 45.2% | 44.0% |
| Capex/Sales | -11.4% | -10.4% | 5.3% | 1.5% | 0.9% | 0.6% |
| Capex/D&A | ns | ns | ns | ns | ns | ns |
| FCF/Sales | -385% | -153% | -21.3% | 26.3% | 31.6% | 28.3% |
| FCF/EBITDA | ns | ns | ns | 46.8% | 48.8% | 42.5% |
| Goodwill/Equity + minorities | ns | ns | 0.0% | 0.0% | 0.0% | 0.0% |
| WCR/Sales | 65.9% | 38.4% | 21.9% | 3.5% | 3.8% | 4.6% |
| Gearing | ns | ns | 10,577% | -617% | -302% | -378% |
| Net financial debt/EBITDA | -1.0x | -1.2x | 2.3x | -0.4x | -0.9x | -1.3x |
| EBITDA/Financial charges | ns | ns | 10.0x | 11.7x | 38.6x | 35.0x |
| ROCE | ns | ns | 16.8% | ns | ns | ns |
| ROE | ns | ns | 2,803% | 981% | 241% | 198% |

| STOCK MARKET DATA | 12/17 | 12/18 | 12/19 | 12/20e | 12/21e | 12/22e |
|---|---|---|---|---|---|---|
| Share price performance | 13.2% | -35.3% | 77.2% | 67.4% | - | - |
| Share price performance vs. CAC M&S | -7.3% | -17.6% | 48.9% | 98.9% | - | - |
| Share price High (€) | 11.50 | 13.30 | 15.10 | 21.60 | - | - |
| Share price Low (€) | 8.48 | 7.00 | 7.00 | 9.00 | - | - |
| Enterprise value (€m) | nd | nd | nd | nd | nd | nd |
| = Market cap. | 33.1 | 38.9 | 46.5 | 89.6 | 89.6 | 89.6 |
| + Net financial debt | 4.3 | 4.9 | 3.6 | -5.0 | -18.8 | -40.9 |
| + Minorities | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| + Provisions & others | nd | nd | nd | nd | nd | nd |
| - Financial assets | nd | nd | nd | nd | nd | nd |

| VALUATION | 12/17 | 12/18 | 12/19 | 12/20e | 12/21e | 12/22e |
|---|---|---|---|---|---|---|
| P/E | - | ns | 55.7x | 11.2x | 6.0x | 4.2x |
| PEG | - | ns | ns | 0.0x | 0.1x | 0.1x |
| P/CF | - | ns | 54.6x | 11.1x | 5.9x | 4.2x |
| EV/Sales | - | nd | nd | nd | nd | nd |
| EV/EBITDA | - | nd | nd | nd | nd | nd |
| EV/C. EBIT | - | nd | nd | nd | nd | nd |
| EV/EBIT | - | nd | nd | nd | nd | nd |
| EV/Capital employed | - | nd | nd | nd | nd | nd |
| P/BV | - | ns | 1562.3x | 109.5x | 14.4x | 8.3x |
| FCF yield | - | -15.7% | -4.0% | 5.9% | 11.7% | 15.4% |
| Yield | - | 0.0% | 0.0% | 0.0% | 0.0% | 0.0% |

# DISCLAIMER

The brokerage firm Gilbert Dupont is authorised by the Autorité de Contrôle Prudentiel et de Résolution (ACPR) as an investment services provider and subject to its supervision.

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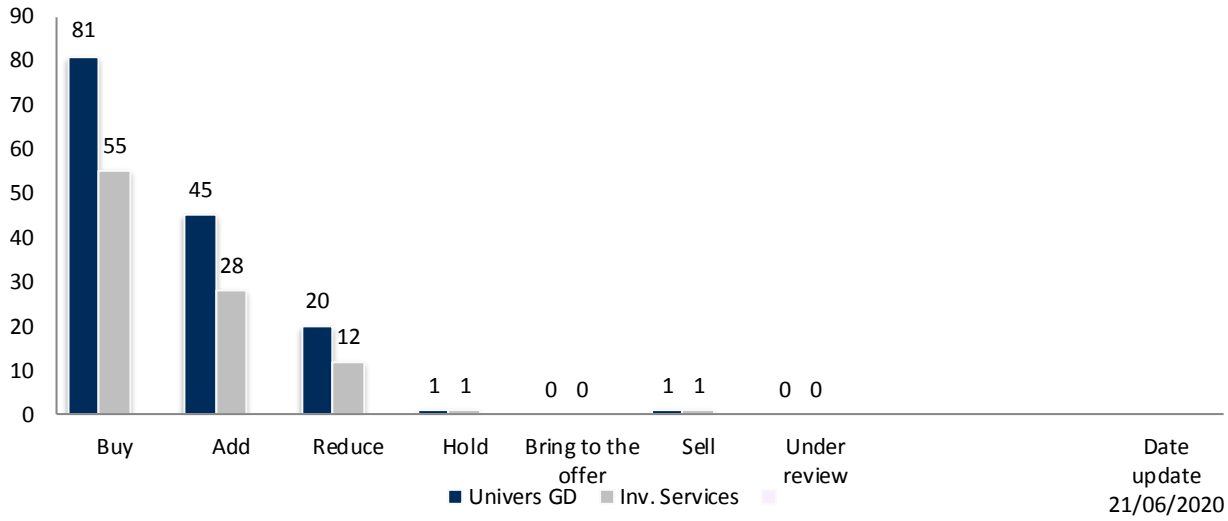
The information, estimates and comments contained in this document are based on sources we consider to be reliable, although their accuracy cannot be guaranteed. They reflect our opinion at the date of publication and can be modified without prior warning. Our stock market opinions are brought up to date on a continual basis. Any change in opinion is accompanied by a written comment. Our Target prices are derived via different methods which are weighted (DCF, Comparable quoted stock market values, Sum of the parts, NAV, Transaction Multiples,...).

Reference prices are based on closing prices. This information is legally protected under the provisions of intellectual property law. Accordingly, the said information may not be used or duplicated without prior authorization. The PEA SME logo associated with all stocks that are eligible for the French PEA SME savings scheme is provided for information purposes only and the brokerage firm Gilbert Dupont cannot be held responsible for any errors or omissions in the communication of this logo. Opinion changes from the past 12 months and all regulatory disclosures can be found by clicking the "Conform" tab at the bottom right of the front page of our website: www.gilbertdupont.fr.

**STOCK OPINIONS**:

Given on a 6 to 12-month horizon, these are established by the financial analysts. These ratings are formulated using a general framework outlined below as well as non-quantitative factors (news-flow, momentum, share price volatility, etc).




**Price Target :** This is derived via different methods which are weighted (DCF, comparable quoted stock market values, Sum of the parts, NAV, transaction multiples).

- Buy : potential increase of more than 15%
- Add : potential increase of between 5 and 15%
- Reduce : potential between –5% et +5%
- Hold : opinion possible in case of IPO
- Bring to the offer : recommandation used as applicable when a compagny is the subject of a takeover bid
- Sell : potential drop of more than –5%
- Under Review : temporarily when a special event occurs

**Favorite stocks** : 2 exisiting lists, each one with a maximum of 10 companies

· Midcaps List : Mkt cap. > €m300 the day of entry
· Smallcaps List : Mkt Cap. < €m300 the day of entry

Calculation of absolute and relative performance is done on the opening price of the day on entry or exit from the list

## DISCLOSURES

1. Gilbert Dupont handles liquidity of the stock, operating as a Liquidity Provider.
2. Gilbert Dupont has a research commitment on the company.
3. Gilbert Dupont handled the placement of the company's share issurance on Eurolist A.
4. Gilbert Dupont handles liquidity of the stock.
5. Gilbert Dupont is Listing Sponsor.
6. Gilbert Dupont handled the placement of the company's share issuance.
7. Gilbert Dupont handled the placement of the company's share issurance on Euronext Growth
8. Gilbert Dupont has signed a service contract with the company.
9. The Crédit du Nord Group was the company's joint introducing bank.
10. The Crédit du Nord group was bookkeeper for the company's equity issue.
11. Gilbert Dupont handled the placement of the company's share issurance on Eurolist B.
12. Gilbert Dupont handled the placement of the company's share issurance on Eurolist C.
13. Gilbert Dupont is managing the placement of the Group’s capital increase.
14. Gilbert Dupont managed the placement of the Group’s capital increase.
15. The stock has been the subject of a tender offer presented by Crédit du Nord.
16. Gilbert Dupont handled the placing of the group's shares.
17. Gilbert Dupont has, in a temporary capacity, a net short position of more than 0.5% of the capital of the issuer.
18. Gilbert Dupont has, in a temporary capacity, a net long position of more than 0.5% of the capital of the issuer.
19. Gilbert Dupont has a mandate to conduct the potential capital increase envisaged by the company
20. Gilbert Dupont is linked to the company via a corporate finance consulting and services contract.
21. This document has been sent to the company for review before it is published. This rereading didn’t prompted the analyst to adjust his target price and his stock market recommendation
22. This document was sent to the company for a rereading prior to its publication. This rereading prompted the analyst to adjust his target price and his stock market recommendation
23. Gilbert Dupont handled the placement of the company's share issuance.
24. Gilbert Dupont handled the placing of the group's bonds

| COMPANY | DISCLOSURES APPLICABLES |
|---|---|
| Biocorp | - |

**HISTORICAL TARGET PRICE (12M)**

| Company | Date | Price (€) | TP (€) |
|---|---|---|---|
| Biocorp | 22/06/20 | 21.60 | 26.9 |
| Biocorp | 28/05/20 | 17.00 | 28.7 |

**HISTORICAL CHANGE OF OPINION (12M)**

| Company | Date | Previous | Current |
|---|---|---|---|
| Biocorp | 28/05/20 | | Buy |

## VALUATION METHODOLOGY

DCF

## RISK(S)

Limiting manufacturing capacity

Arrival of new technologies