

FOR circular zero

together we're life-changing



CBS
CASE
COMPETITION

life-
changing
careers



novo nordisk®



Lars Fruergaard Jørgensen
CEO, Novo Nordisk

Dear students!

At Novo Nordisk, we are committed to driving change to defeat diabetes and other serious chronic diseases. To fulfil this purpose, we pioneer scientific breakthroughs, expand access to our medicines, and work to prevent and ultimately cure disease.

For almost 100 years, we've focused on diabetes, and we have become one of the world's leading healthcare companies. Today, we are also using our capabilities to tackle other unmet needs in chronic diseases, such as obesity, and in rare blood and endocrine disorders.

We've been at the forefront of corporate environmental responsibility for almost two decades and we recently met our target of using 100% renewable power in our global production. But it's no longer enough to focus on the environmental impact of our production alone.

Environmental challenges have never been more critical or more urgent than they are today. Growing consumption, industrialisation and urbanisation threaten not only the sustainability of the environment we live in, but also the health of people around the world. To lead the way and be at the forefront of change, we must be bold and take a broad, company-wide approach to solving environmental issues.

Every year we use billions of litres of water and large amounts of energy and resources to manufacture medicines. Our CO₂ emissions continue to rise, especially in transportation. We distribute hundreds of millions of vials and injection pens to people who need them – and demand for our life-saving treatments is growing. Our products are made of high-quality materials, but after use, most of them end up in landfill.

This puts us at the frontline of some of the biggest environmental issues: climate change, water and resource scarcity, pollution and plastic waste. To

address these challenges and more, in 2019 we adopted a new environmental strategy with the aspiration to have zero environmental impact.

To get there, we need to rethink our approach to how we conduct our business. We must design and produce our products so that they can be recovered and re-used, minimise consumption across our value chain and eliminate waste – in other words apply a "circular mindset" to whatever we do, wherever we do it.

We call our environmental strategy "Circular for Zero". Our aim is to achieve three things; Circular Supply, a Circular Company, and Circular Products. We don't have all the answers yet, but we do know it will require development of new technologies and services. Circular for Zero is a long-term strategy.

My challenge to you is this: How we can use the circular economy as a driver to reach more patients by 2050 while striving for zero environmental impact?

I am very excited to see what innovative ideas this case competition and your input can entail – and I thank you in advance for your engagement in helping us serve more patients.

I am very proud that Novo Nordisk is the case company for the 2020 CBS Case Competition Global and I am confident that through this experience, you will increase your understanding of how a global company operates and how we strive to create value for our patients and for society.

Kind regards,

Lars Fruergaard Jørgensen

CEO, Novo Nordisk



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Setting the stage

The number of people living with diabetes is increasing rapidly worldwide and is set to increase even further in the years to come due to aging demographics and obesity on the rise worldwide. Diabetes is one of the greatest health care issues of the 21st century, with the number of adults living with diabetes having more than tripled over the past 20 years. It is estimated that 463 million adults are currently living with diabetes, approximately 9.3% of adults aged 20-79. According to International Diabetes Federation (IDF), current estimates show that 786 million adults will have diabetes by 2050.

Achieving the impossible

Since its founding, Novo Nordisk has been determined to develop the best possible diabetes care. This involves tremendous scientific research and innovation into treatment options. As an example, in 2019, Novo Nordisk launched their first

oral GLP-1 treatment option for type 2 diabetes. An invention which was previously thought to be impossible by many.

Frontrunner in sustainability

Sustainability and environmental considerations have been part of Novo Nordisk's DNA for decades. In 1993, Novo Nordisk was the first company in Denmark - and one of the first in the world - to prepare an environmental report describing its resource consumption and emissions and the Triple Bottom Line is anchored in the company's Articles of Association (bylaws). Furthermore, Novo Nordisk was the initiator of the partnership programme Cities Changing Diabetes in 2014 to fight urban diabetes. In 2019, Novo Nordisk implemented an ambitious environmental strategy, Circular for Zero, striving for zero environmental impact through the implementation of circular economy.

“Your challenge:

How can Novo Nordisk use circular economy as a driver to reach more patients by 2050 while striving for zero environmental impact?”

Challenges going forward

In order to maintain their strong market position, Novo Nordisk must strive to predict and adapt to the changing needs and demands of patients, as well as other stakeholders. This requires innovative thinking, cultural apprehension and understanding the patients. Our challenge to you is the following problem:

How can Novo Nordisk use circular economy as a driver to reach more patients by 2050 while striving for zero environmental impact?

Novo Nordisk has hired your expertise to develop a solution that can support them on their journey to reach more patients living with diabetes and obesity.

In addition, the following questions should be taken into consideration during the development of your solution:

- Where should Novo Nordisk focus their efforts both geographically and demographically?
- How can Novo Nordisk revamp their business model to reach their target of zero environmental footprint and becoming more sustainable?
- How can United Nations’ Sustainable Development Goals be incorporated as an integral element in your solution?
- What can Novo Nordisk do to quantify and measure the following impact that your solution will unveil? In terms of financial, social and environmental measurements and other relevant KPI’s.

Introducing Novo Nordisk

History

Today, Novo Nordisk is praised as one of the most successful and innovative companies in Scandinavia. The company traces its origins to a visit in 1922 to the United States by the Danish Nobel laureate August Krogh, who - along with his wife, Marie Krogh - had received invitation by researchers at Yale University to lecture throughout the country on his medical research. During their tour, the couple received news of the recent discovery of insulin, the hormone used to treat diabetes. This held particular interest for Marie, who suffered from type 2 diabetes, and the couple eventually returned to Copenhagen with the right to produce and sell insulin in Scandinavia and, in 1923, August established the company Nordisk Insulin Laboratorium with partners August Kongsted and Hans Christian Hagedorn.

Before initiating production, however, the company found itself in need of machines to produce the insulin. Krogh and Hagedorn agreed that Harald Pedersen, a renowned engineer based in Copenhagen, was the perfect candidate. His brother, Thorvald Pedersen, would later be hired as a pharmacist, but soon a clash of personalities developed between Thorvald and Hagedorn, eventually resulting in the departure of the brothers from the company. The brothers continued working with insulin, and in 1925 they founded the company Novo Terapeutisk Laboratorium, a competitor to Nordisk Insulin Laboratorium.

1923

Nordisk Insulinlaboratorium founded.

1946

Nordisk develops isophane insulin (NPH), a neutral insulin with prolonged action.

1958

Novo establishes its first subsidiary in Mainz, Germany.

1981

Novo becomes the first company in Scandinavia to be quoted on the New York Stock Exchange.

1925

Novo Terapeutisk Laboratorium founded.

1951

Novo establishes the Novo Foundation with the object of supporting scientific, social and humanitarian causes.

1959

Novo builds laboratories in Bagsværd.

1985

NovoPen® is launched – an injection system similar in appearance to a fountain pen, with replaceable insulin cartridges.

Throughout the next 30 years, the companies prospered and contributed with landmarks within production of insulin, including highly purified insulin, yeast-based insulin and prefilled insulin injection pens. Furthermore, Novo developed enzymes oriented towards detergents as well as hormone products, and Nordisk's range of products came to include products for the treatment of plasma deficits and blood issues.

In 1989, Novo and Nordisk were the second – and third-largest producers of insulin, respectively, and - following 60 years of fierce competition - the two companies merged into the largest producer of insulin in the world, Novo Nordisk. Simultaneously, the Novo Nordisk Foundation was founded to

support scientific, humanitarian and social causes. The Foundation has since evolved into one of the largest in the world. Additionally, the foundation owns all of Novo Nordisk's A-shares, ensuring the independency of the company.

Today, Novo Nordisk has developed into the largest Danish public company in terms of market value. The company has a global presence and is helping 29,200,000 people living with diabetes and other chronic diseases around the world, making their lives easier, while aiding the process of changing lifestyle permanently to be successful for every patient they are treating.

1989

Novo Industri A/S and Nordisk Gentofte A/S merge to become Novo Nordisk A/S – the world's leading producer of insulin. The company is wholly owned by the Novo Nordisk Foundation.

2000

Novo Nordisk is split into three separate companies operating under the umbrella of the Novo Group: Novo Nordisk A/S, Novozymes A/S and Novo A/S.

2006

Novo Nordisk becomes the 10th company in the world to join the WWF Climate Savers, committing to reduce its carbon emissions by 10% by 2014 compared with 2004.

2015

Novo Nordisk launches their first treatment option for obesity, in the US.

1994

Novo Nordisk is the first company in Denmark – and one of the first in the world – to publish an environmental report.

2002

Novo Nordisk signs the United Nations Global Compact, a platform for promoting good corporate principles and learning experiences in the areas of human rights, labour, environment and anti-corruption.

2007

Novo Nordisk inaugurates its largest insulin production facility outside of Denmark in Montes Claros, Brazil.

2019

Novo Nordisk introduce a daily diabetes tablet, the first oral treatment option in the GLP-1 class.

The Novo Nordisk Way

Novo Nordisk has a rich foundation from its founders, who envisioned a brighter future for every-one affected by diabetes. In order to properly integrate this visionary mindset into the company that has since come to compromise thousands of employees globally, Novo Nordisk has defined a set of core values, referred to as “The Essentials”.

1

Novo Nordisk creates value by having a patient-centred business approach.

6

Novo Nordisk treats everyone with respect.

2

Novo Nordisk sets ambitious goals and strives for excellence.

7

Novo Nordisk focuses on personal performance and development.

3

Novo Nordisk is accountable for its financial, environmental and social performance.

8

Novo Nordisk has a healthy and engaging working environment.

4

Novo Nordisk provides innovation to the benefit of its stakeholders.

9

Novo Nordisk strives for agility and simplicity in everything it does.

5

Novo Nordisk builds and maintains good relations with its key stakeholders.

10

Novo Nordisk never compromises on quality and business ethics.



Products

Novo Nordisk's product portfolio includes medicine used to treat diabetes, obesity, haemophilia, as well as human growth hormones and hormone replacement therapy. Within diabetes, Novo Nordisk has a wide range of insulins and is specialized in Glucagon-like peptide-1 (GLP-1) which is used to treat type 2 diabetes. GLP-1 is an incretin hormone that causes insulin to be secreted. These APIs, when injected under the skin, have a stimulating effect on the insulin production and will make it more effective. In addition, it reduces appetite, aiding weight loss for patient with obesity.

Treatment of type 1 diabetes and severe type 2 diabetes (when GLP-1 becomes insufficient) involves the injection of insulin. Injectable insulin comes in different types; long-lasting insulin, premix insulin, fast-acting insulin and human insulin. They have different durations of effectiveness and the combination of these insulins is adjusted to meet the individual needs of the patient.

For decades, Novo Nordisk has invested heavily in R&D to discover and develop innovative medicines and treatment opportunities. In 2019, the very first and only GLP-1 tablet was developed by

Novo Nordisk with the brand name of Rybelsus®. The development of an oral treatment option is considered a breakthrough in the treatment of diabetes and the experience of patients living with diabetes.

Novo Nordisk currently have seven devices used for treating diabetes. They can be categorised into two groups, Reusable (durable) pens and Prefilled (disposable) pens. With the use of Reusable pens, the patient must replace the cartridge when it is empty, and all doses have been used with a new filled cartridge. Prefilled pens are supplied with insulin inside and should be thrown away when they are empty, or after 30 days of use (depending on the type of insulin and its in-use time). Single-use needles need to be attached before each use of the pen to reduce the risk of contamination, infection, blocked needles and inaccurate dosing.

Names on all portfolio of devices can be found in appendix 3 and 4. For a detailed guide on how durable and disposable devices are to be used by the patient please watch [NovoPen®4 – Quick Guide](#) and [FlexTouch® Insulin Pen Quick Guide](#).

Corporate Strategy

In order to remain at the forefront of a dynamic industry, Novo Nordisk's corporate strategy is adjusted annually to the current market position and challenges - all while retaining the common denominator of a leading position in their markets of operations and staying true to The Novo Nordisk Way. The current strategy rests on four pillars: Strengthening leadership in diabetes, strengthening leadership in obesity, establishing a strong presence in Non-Alcoholic Steatohepatitis (NASH) and Cardiovascular Diseases (CVD) and addressing unmet needs in haemophilia and growth disorder.

In order to *strengthen the leadership in diabetes*, two paths have been identified: consolidating the position as the world's leading supplier of insulin, as well as redefining the treatment of type 2 diabetes through an increased presence in the field of GLP-1 products, the latter constitutes the primary growth driver for Novo Nordisk. An integral part of the strategy is to increase the attention and knowledge surrounding cardiovascular risks associated with type 2 diabetes, as clinical data has associated Novo Nordisk's GLP-1 products with a remarkably high security profile in terms of the cardiovascular risks – thus highlighting yet another potential comparative advantage - along with superior blood glucose control and weight reduction. Furthermore, in September 2019, Rybelsus® was approved by the US Food and Drug Association, and licenses currently awaiting approval have been submitted for Europe and Japan. This could potentially pave the way for a leadership position in the oral segment.

In order to *strengthen the leadership position in obesity*, Novo Nordisk is determined to ensure that every patient living with obesity receives the treatment they need. This requires not only a change in perception of obesity as a chronic disease, which Novo Nordisk will continue to fight for through the forging of new partnerships with associations and other stakeholders, but also the

development of pharmaceutical interventions designed to combat obesity. Saxenda®, the first of such agents developed by Novo Nordisk, has been launched in 41 countries and continues to be an important driver of sales growth; furthermore, the success of Saxenda® has fuelled the ambition of developing a diverse range of future obesity products such as semaglutide 2.4 mg – an oral GLP-1 product for once-weekly use.

Establishing a strong presence in NASH and CVD is a recent field of interest for Novo Nordisk – and a logical measure to diversify the pipeline, given how adjacent these areas are to diabetes and obesity. 80% of diagnosed NASH patients are suffering from obesity, and 35% have type 2 diabetes, while Atherosclerotic cardiovascular disease is the main cause of death for 70% of diabetes patients in the Western world. Novo Nordisk is seeking out new research collaborations in order to tap into external expertise, while currently developing a semaglutide project as a potential treatment for NASH and exploring the opportunities to enter the market for CVD treatments.

Finally, Novo Nordisk aims to *address unmet needs in haemophilia and growth disorder*. Firstly, Novo Nordisk aims to broaden its presence within haemophilia, while at the same time retaining its value position through the existing haemophilia portfolio and through the continuing launch of products in new markets across the globe. In the market of growth hormone disorders, Norditropin® is the leading growth hormone therapy, and the competitiveness of the product will be increased through the implementation of improved delivery services. Furthermore, the introduction of the long-acting compound somapacitan – currently under development and expected to become the first once-weekly treatment for adult growth hormone deficiency – is expected to consolidate Novo Nordisk's presence in the market.



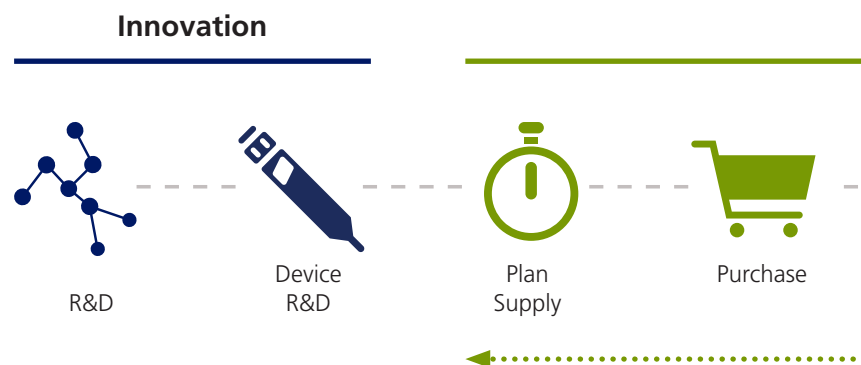
“You do not develop a strategy for the coming months, but rather for the years, if not decade to come. So you need to understand where society is moving, how the economy is developing and how values may be changing.

At Novo Nordisk we have extremely long product development cycles which requires us to think more long-term than a lot of other industries”.

Niels Lund
*Vice President,
Health Advocacy.*



Product Supply manufactures and distributes high quality biologic pharmaceuticals



Value Chain

R&D

Research & Development is the backbone of Novo Nordisk. Taking a patient-centric-approach, the company is developing best-in-class treatments at their R&D facilities – starting from the molecule. They collaborate with academia and biotech companies around the world to foster new innovations. A significant portion (13.2% in 2018) of revenue is invested into R&D. In the R&D phases only one out of 5000 ideas reach the market. A drug costs 2-6 billion USD to develop and the time period necessary to make the product takes up to 10-15 years.

Device R&D

Innovation of Drug-Delivery-systems is fundamental for improving patient experience. Novo Nordisk collaborates with universities to invent new and better ways of delivering medicaments to the patient. The new pill-sized device marks the beginning of research in oral

biological medications for more efficacious treatments to patients and improved devices.

Plan Supply

The production and planning of supplies is based on marked input.

Purchase

Responsible sourcing is a key priority and is manifested through the Responsible Sourcing programme that conforms to the principles of the [Triple Bottom Line](#) throughout the supply chain. Global implementation of responsible sourcing standards for business partners have been put in place to communicate requirements clearly. As a market leader the supplier base covers a wide range of goods and services amounting to approximately more than 40,000 suppliers. Partnering with diverse suppliers is pursued through the Diverse Supplier Initiative to benefit from unique perspectives.

“It is our core values to balance our financials with social and environmental aspects. The triple bottom line is one of the main reasons why we have the sustainability strategy we have and why we are ahead today.”

Niels Lund

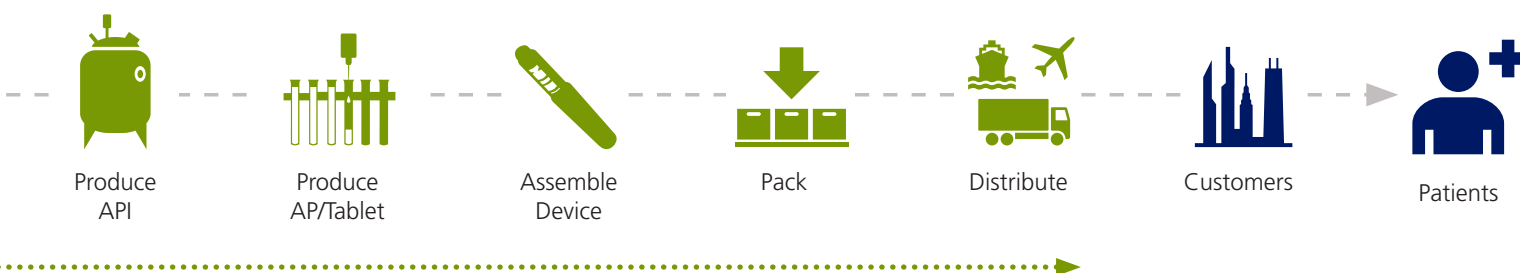
Vice President, Health Advocacy

Produce API

Raw materials are fermented in steel tanks and afterwards recovered and purified until it becomes an active pharmaceutical ingredient (API) at the facility in Kalundborg, the world's largest facility for insulin production. Furthermore, Novo Nordisk is subject to strict [Good Manufacturing Practices](#) requirements.

Operations in Product Supply

Customers and Patients



Manage supply of all markets and phase 3 development products in Novo Nordisk

Produce AP/Tablet

At facilities in Brazil, France, US, Denmark and China tablets and aseptic products are manufactured through formulation. Insulin is processed and in-process checks are conducted before it is transferred to the aseptic core where it is filled into cartridges.

Assemble Device

When devices are assembled, regulatory checks are made to ensure specific country demands are met to guarantee delivery of safe products. That is typically because different customers and regulators demand specific production compositions for their market. For example, the production site inserts a country specific label in a local language.

Pack

Products are put into final containers that are standardised according to the market in which the strategic production facility is located. This allows Novo Nordisk

to have a global manufacturing set-up that enables the company to utilise local knowledge to ensure the most suitable adaptation to the individual markets.

Distribute

Novo Nordisk distribution centres keep continuous compliance with all applicable laws, regulations and ordinances, and all around-the-clock security is provided to protect the product storage. To practice global supply through local production, products are delivered or picked up by local third party-suppliers as many products require special handling. For example, Novo Nordisk must keep a cooling chain intact for their products in the distribution phase – otherwise the products are discarded.

Customers

Novo Nordisk sell their products through local affiliates. This allows for marketing and sales practices to target customers in

the most appropriate way, by adapting to socioeconomic and geographical characteristics, as well as governmental and regulatory issues. Customers of Novo Nordisk vary greatly across geographical locations, and examples of customers include Ministries of Health, pharmacies, hospitals and insurance companies and as such there is no direct B2C.

Patients

The medicine is prescribed to the patients by customer clients. The extent to which patients can be reached directly depends on how public and legal authorities interfere, which determines how marketing practices can be conducted. To continuously innovate and improve the patient experience, Novo Nordisk fosters long-term relationships with patients, for instance by consulting them during their R&D processes.

Global presence and production setup

DENMARK (~8,850 FTE'S)

Diabetes and biopharmaceutical
active ingredient production
Filling and packaging
Moulding and assembly
Tablet production

NEW HAMPSHIRE, USA (~190 FTE'S)

Biopharmaceutical
active ingredient production

CLAYTON, NC, USA (~1,210 FTE'S)

Diabetes active ingredeint production
Filling and packaging
Assembly

MONTES CLAROS, BRAZIL (~990 FTE'S)

Filling and packaging
Assembly

● Corporate Head Quarter Bagsværd (Denmark)

North America Operations HQ
Plainsboro (NJ, US)

International Operations HQ
Zürich (Switzerland)

● Regional offices

- Beijing (China)
- Sao Paolo (Latin America)
- Tokyo (Japan & Korea)
- Copenhagen (Denmark)
- Dubai (Africa, Asia, Middle East & Oceania)

● Strategic Production Sites

Brazil, China, Denmark, France and the US.

R&D Centres
China, Denmark, India, UK and the US.



**Novo Nordisk
affiliates in**

**80
countries**

Global production setup is unaudited and does not form part of the consolidated financial statements.



**KALUGA,
RUSSIA (~270 FTE'S)**

Filling and packaging
Assembly

**KORIYAMA,
JAPAN (~70 FTE'S)**

Packaging

**TIANJIN,
CHINA (~1,060 FTE'S)**

Filling and packaging
Assembly

**CHARTRES,
FRANCE (~1,170 FTE'S)**

Filling and packaging
Assembly

**TIZI OUZOU,
ALGERIA (~220 FTE'S)**

Tablet production

Novo Nordisk markets
its products in

170
countries
worldwide

Understanding the Diabetes Industry

Global Pharmaceutical Industry

Today, pharmaceuticals have developed into a \$1.2 trillion industry and with an expected CAGR of 5.7% from 2020 to 2022. There is still plenty of demand and opportunity for pharma companies to fulfill the important role of treating and curing diseases for a better future for tomorrow. This holds particularly true for the diabetes industry; according to International Diabetes Federation, only 35 million are currently in good control of their condition, as opposed to the estimated 400 million patients with diabetes still not receiving treatment.

If one dissects the regional markets within the pharmaceutical industry, the North American market is by far the largest – accounting for more than a third of the global revenue and with a CAGR in the past five years of 4.5%. The growth is in large part fuelled by the free market approach within healthcare; notably the US is one of the few countries in which pharmaceutical companies are allowed to do marketing and target the consumer directly. Nevertheless, the sector has faced an abundance of complaints from the public due to the high – and continually increasing – prices of drugs cost of the health care systems.

Despite the current obstacles, the market is expected to continue expanding in the next three years with an average CAGR of 4.3%, to reach a total value of \$484.7 billion in 2023.

The highest growth rates, however, are found in Asia-Pacific, a region that has seen an average CAGR of 6.5% in the past five years. The primary growth drivers in Asia-Pacific has been the ageing of the demographics and the growing middle class. Economic growth and improving life conditions are usually followed by an increase in lifestyle diseases, such as diabetes. According to World Health Organisation, 110 million residents of China are estimated to suffer from diabetes, and the number is expected to rise to 150 million by 2040; additionally, almost half the Chinese population – 500 million people - has prediabetes and is thus more likely to develop the actual condition. As a consequence, the market is expected to grow at an average annual rate of 9% and reach a value of \$500 billion in 2023.

With a value of \$287 billion, the European market currently constitutes 25.8% of the global market value in pharmaceuticals. Despite suffering from an ageing population, the European countries have displayed a comparatively lower growth. The primary cause underlying this development is the universal public health system and the increased pressure on the healthcare to reduce costs in the face of an increasing burden of chronic diseases. Therefore, the sales of products that has lived past their patent protection constitutes a larger share of the sales volume in the European markets, in turn stalling the acceleration of market growth.



As a consequence of these factors, the market is expected to grow at an average of 3.7% until 2023, where it is expected to reach a value of \$345 billion.

The pharmaceutical industry is heavily dependent on research and development and it is not unusual for companies to invest 20% or more of their revenue in R&D measures. Most of the new pharmaceuticals traces their roots back to the US, a traditional stronghold of innovation in the industry. Nevertheless, the companies are heavily dependent on the upholding of patents; and the steady loss of patent protection thus poses a risk for the entire industry that finds itself in an increasing need to develop new innovations to continue to capitalize on the market growth.

Lastly, the pharmaceutical industry is heavily regulated. Challenges include market fits in the form of local product-specific requirements, general legal proceedings, guarantees and patent approvals, marketing and sales practices.

**Only 8.75%
receive
proper
treatment**



Understanding the Patient

Patient Centric Business

Novo Nordisk has a heritage of being a patient centred company that strives to always engage closely with people living with diabetes. The company recognizes that treatment of diabetes ought to be aligned with the social factors present in the patients' everyday life. Hence, the method of using only medicine to treat the patient will in most cases not suffice to give the patient the life they deserve. Currently, the [Rule of Halves Analysis](#) works with frameworks to identify where the majority of clinical needs are, as illustrated in the following figure.

A socio-psychological approach

Novo Nordisk emphasizes that social factors affecting life quality of the patient is a complex matter and the relevance of taking a socio-psychological approach as seriously as a biomedical becomes important. Therefore, understanding social determinants of people living with diabetes is crucial when striving to reach more patients earlier and retaining them for stable treatment.

Diabetes – not a rich man's disease

Severe overweight is one of the major causes for developing type 2 diabetes. Out of all cases of diabetes in the world, type 2 diabetes counts for 90% and moreover 650 million people live with obesity. Three out of four people living with diabetes live in low- and middle-income countries.

Additionally, people living with diabetes are often under-educated, living under poor conditions, have lower income levels and are generally socially distressed. Thus, being diagnosed with diabetes is seldom the highest concern, especially due to the fact that complications caused by diabetes such as kidney failure, cardiovascular disease, blindness and amputation – not to mention premature death – might be 20 years ahead in the future if you are diagnosed at the age of 45.

Locating the patients

Diabetes patients can be divided into two segments. The first segment is developed countries such as USA, Japan and the European countries. These markets are predominantly composed of red oceans, all demanding a focus on improving patient service. The second segment is composed of developing countries centred around Southeast Asia, Bangladesh and Pakistan. In China alone, more than 120 million people live with diabetes, of which only some 30 million receive treatment. These markets can be classified as blue oceans. Additionally, despite lower urbanization and slower economic growth, Africa is also showing market potential. However, market differences require a tailored approach, not only in terms of market expansion, but also to address the country-specific needs of patients. Data on global diabetes forecasts can be found on [IDF](#).



The Rule of Halves Framework

Of the estimated 415 million people with diabetes...

about 50% are diagnosed...

of whom about 50% receive care...

of whom about 50% achieve treatment targets...

of whom about 50% achieve desired outcomes...



Diabetes



Diagnosed



Receive care



Achieve treatment targets



Achieve desired outcomes

The Rule of Halves framework illustrates the global diabetes burden and indicates where the largest unmet clinical needs are.

Five Core Patient Needs

“We have to relate to the patients as individuals, understand their reality and surrounding environment which differs depending on geographic location, socio-economic status and cultural traditions etc. This is why we must go beyond supporting with just insulin and offer other services and support to help them manage their disease in the context of their everyday life”.

Niels Lund

Vice President, Health Advocacy

Insights into the personal status of patients can serve as a foundation to identify undiagnosed individuals, while leading to an increased level of stable treatments. Novo Nordisk works with five focus areas that serve as a tool to improve the patient treatment process: Social Support, Reducing Complexity, Holistic Treatment, Self-Care Capabilities and Balancing Life and Disease.

Social Support is of crucial importance for understanding the patients and their reality better are of crucial importance. Therefore, the medicine must be complemented by patient support programmes. Creating a community around diagnosed individuals has the potential to increase customer satisfaction, in turn fostering long-term relationships with the patient.

Reducing Complexity is another element to optimize how the treatment takes place. Researching on new and less complex treatment methods will allow more patients to feel motivated to continue their treatment. Novo Nordisk is in direct contact with patient organisations as it has shown to be a valuable method to identify what kind of improvements would be valued.

Holistic Treatment emphasises the need of the doctor to understand what is taking place in the lives of the patients. To study this, Novo Nordisk has employed anthropologists who visit patients globally. They move into patients' homes and observe how their lives are unfolding on a daily basis. Conducting such analysis discloses which everyday complications arise when you are diagnosed with diabetes.

Self-Care Capabilities revolves around a focus of educating the patients diagnosed with diabetes and other chronic diseases. It involves enlightening the patients on their disease, new diets and meals, and how to become more comfortable with their illness. This serves as a tool to make the patient more confident in tackling their diagnosis in the long-term.

Balancing Life and Disease has a focus of helping patients accepting their new normal. People living with diabetes have a 2-3 times larger risk of developing mental illnesses as they perceive their illness as a “death sentence”. The main focus is offering support within other areas than the medicaments, in order for patients to become familiar with their new reality and subsequently accepting it.

All new initiatives at Novo Nordisk are assessed according to these five focus areas. Thus, for a business proposal to gain recognition within the company, it must adhere to these principles.

The five-core-patient-needs value chain

Tools to increase value generation

Social Support

PSP
Access to help from educated personnel
Creating communities

Reduce Complexity

Dialogue with patients
R&D
Optimize treatment process
i.e. easier treatment

Self-care Capabilities

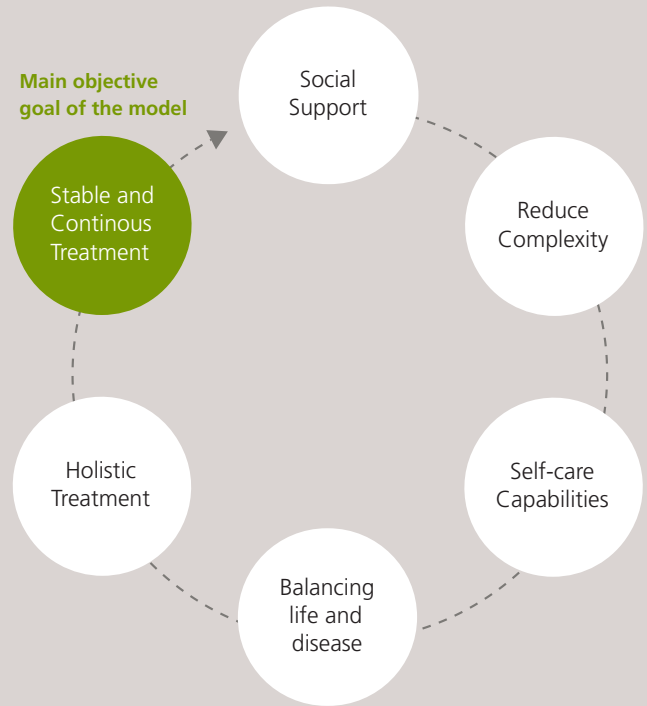
Educate the patients
Make information more accessible
Increase comfort of self-treatment

Balancing life and disease

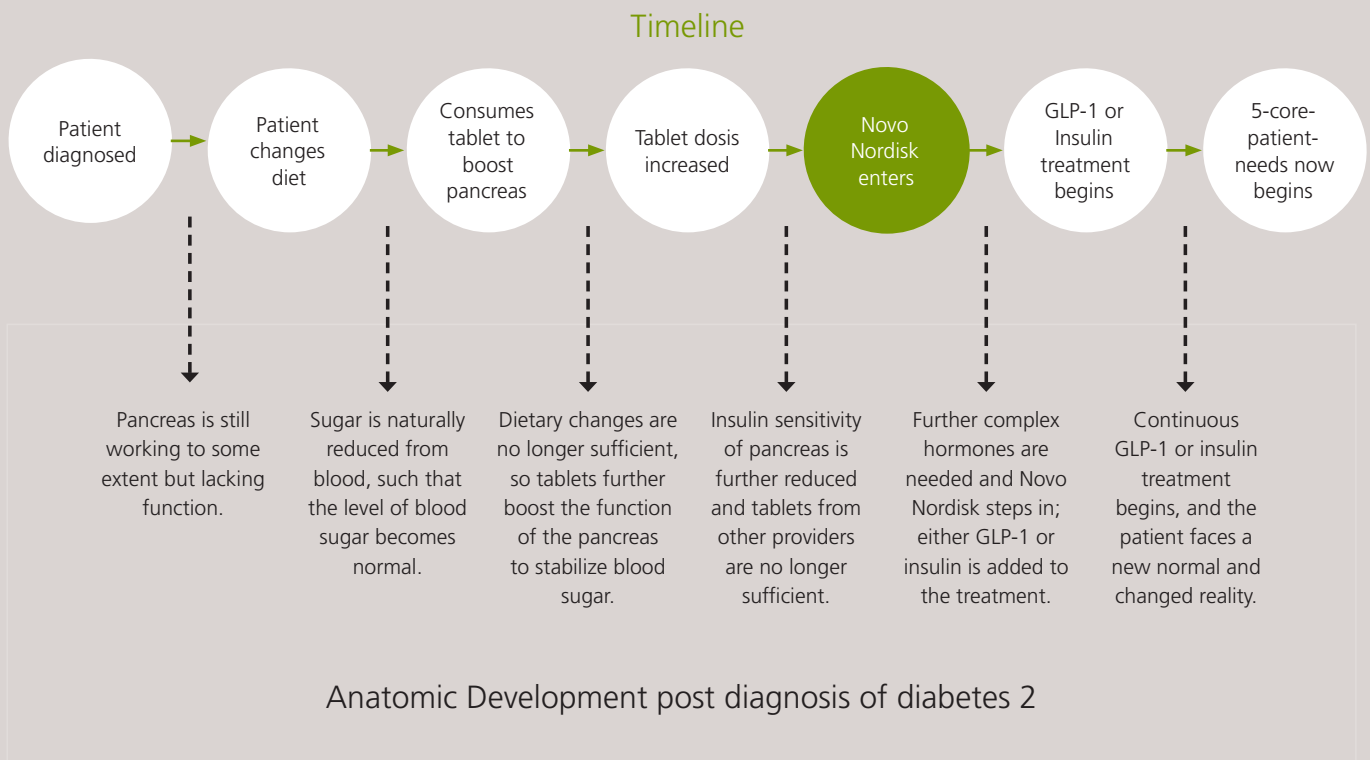
Acknowledge seriousness
Prepare patients for new reality
Provide support for psychological reactions

Holistic Treatment

Anthropologists
Patient Representatives
Collaboration between researchers and patients



When does Novo Nordisk enter the picture post diagnosis of type 2 diabetes



Emergent Patient Trends

Three primary trends are currently holding large potential when looking at identifying new patient opportunities.

1 A better understanding of the patients' reality

It has become highly important to understand social determinants in depth – how does social factors affect the risk of chronic diseases? Novo Nordisk has recently implemented the Cities Changing Diabetes initiative that aims to understand and leverage from the emerging issue of the patient population being highly concentrated in cities.

2 Low- and middle-income countries

Historically, health care sectors in developing countries have had a focus on fighting infectious illnesses such as malaria, HIV-AIDS and TB and other diseases requiring vaccination. Treatment of chronic diseases has not yet been explored to the same extent, which has resulted in a lack of capacity of treating diabetes, severe overweight and cardiovascular diseases. A large challenge exists in improving the quality in the treatment of chronic diseases, particularly as many low- and middle-income countries are experiencing rapid economic growth, and therefore also quickly adopt life-styles traditionally seen as “western”.

3 The “Active Patients”

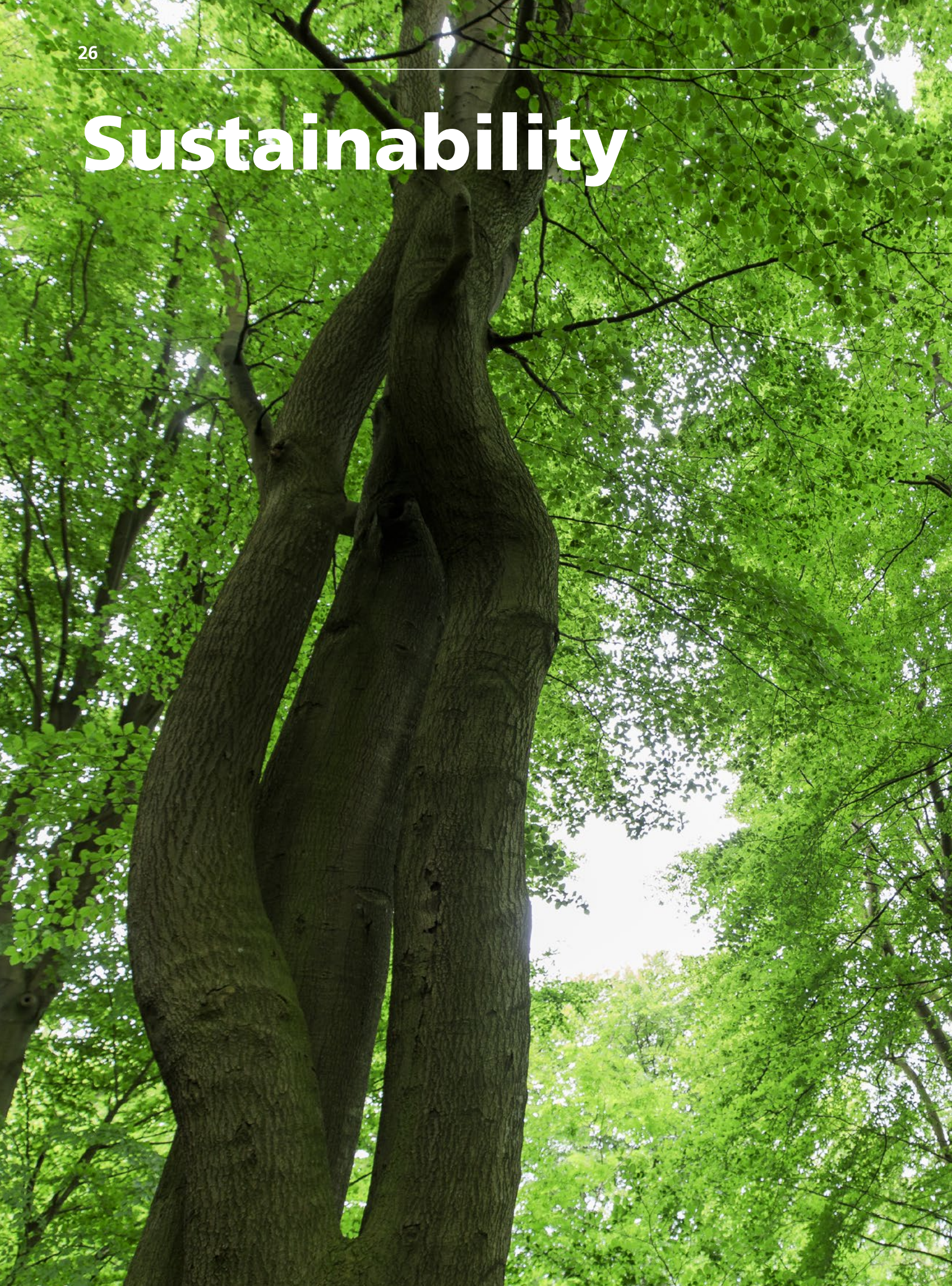
The “Active patients” are primarily centred in the Western world. Here, patients are currently moving towards being consumers. That is, patients are showing interest in understanding the medicines and treatment that they are consuming, for example by demanding access to more information regarding how products are produced and evaluate which treatments they prefer – sometimes without consulting a doctor. Technology innovation and climate change are subjects of concern for these consumer-patients.



Daniele Granats
Data Scientist

Nete Sloth Bækgaard
Development Professional

Sustainability



Environmental Milestones

1975	Environmental Department Established
1980	First Environmental Policy
1993	Novo Nordisk Waste Water Plant at Kalundborg inaugurated and First environmental report published.
1996	First Green Account for Site Kalundborg
1997	Kyoto Protocol
2002	All Novo Nordisk factories ISO 14001 certified
2004	Initial Strategy Work with The World-Wide Fund for Nature
2005	Climate Strategy
2007	Ørsted Energy partnership on Electricity from wind
2009	Optimized fermentation and Horns Rev 2 windmills start producing green energy
2010	Ørsted partnership focusing on gas and steam and the 2020 climate strategy
2011	Vestas partnership on wind in China
2012	Environmental strategy launched
2015	Climate Ambition and Gold Power wind certificates in China
2016	Paris Agreement
2018	New company car policy launched & Science-Based Target Approved. Partnership with Vattenfall on wind solution for European sites
2019	New Environmental Strategy 2030: Circular for Zero. New US Solar solution signed
2020	Kalundborg Green Steam and RE100 commitment accomplished.

circular FOR zero

together we're life-changing

A circular approach since 1972

Striving for a circular mindset is not new to Novo Nordisk. In 1972 the company co-founded Kalundborg Symbiosis, the world's first working industrial ecosystem. The ecosystem builds on a concept where used resources (waste) from one enterprise are being reused elsewhere by another entity.

Novo Nordisk has committed to several environmental initiatives, among others CDP, RE100 and EV100. In 2019 Novo Nordisk made the decision to take their environmental commitments one step further, by implementing a new strategy, called Circular for Zero, to accommodate the ambition of achieving zero environmental impact.

Circular for Zero is based on the principles of circular economy. Circular for Zero aims at eliminating the negative footprint that Novo Nordisk makes in its value chain – for instance through procurement, transportation and waste – by adopting a circular mindset. The strategy serves as a policy, advocating for a circular approach to environmental management, product stewardship and climate action. Use of resources, CO₂ emissions and waste are the key environmental challenges.

Circular for Zero is divided into three pillars, Circular Supply, Circular Company and Circular Products.

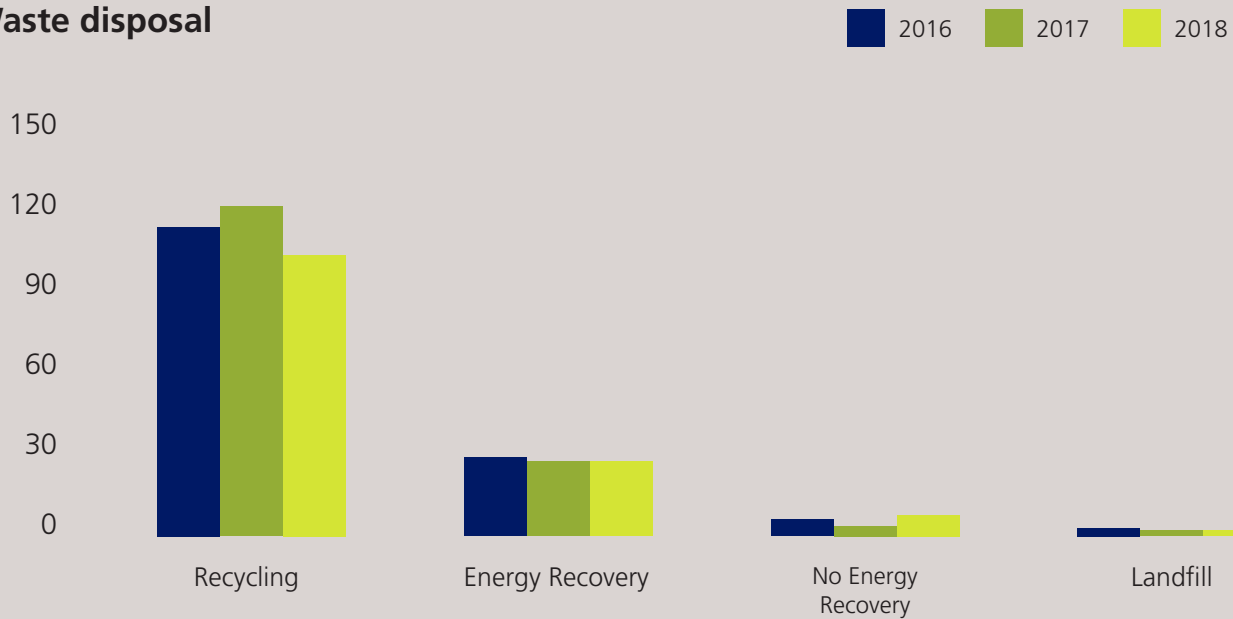
Circular Supply

Eliminating environmental impact throughout the value chain requires joint efforts with suppliers. Therefore, the sustainability of supplier operations is an essential part to decrease the environmental footprint of Novo Nordisk. By engaging in partnerships and collaborations with suppliers at all levels of the supply chain, Novo Nordisk aims for circular sourcing and procurement by advocating for circular business practices and increasing recycled and carbon-neutral materials and resources. Only around 10% of Novo Nordisk's total CO₂ emissions are generated by the company itself, which leads to unsolved questions on how environmental impact can be decreased through improved partnerships with existing and future suppliers.

Circular Company

Novo Nordisk aims to continuously reduce their environmental footprint of their production by striving for zero loss of water and energy, reduction in CO₂ emissions and elimination of waste sent to landfill. To reach these goals, several initiatives have been implemented.

Waste disposal



Source: Novo Nordisk Annual Report 2018

Water Stewardship concerns the re-use of water where possible, mapping of production sites in regions subject to high water stress and elimination of wastewater. Actions include optimization of production process to reduce water consumption, as well as water saving projects at production sites.

Energy reductions are obtained through optimizations in production and energy saving projects.

CO₂ emission initiatives involve the transition to renewable electricity throughout Novo Nordisk's global production. In 2020, Novo Nordisk achieved their goal of 100% renewable electricity across all production. Novo Nordisk is striving for zero CO₂ emissions from their global operations and transport by 2030. Actions taken include the switch towards electric cars, increased use of virtual meetings and distribution of products by sea transport. The next step will include the transition to renewable energy solutions in office buildings and laboratories.

Waste Management concerns the reduction of waste generated and continuous increase in the amount of waste reused and recycled. Examples include the creation of biogas from organic residues, recycling ethanol and reducing production waste as a part of their Environmental Management System.

Circular Products

When the products leave Novo Nordisk's distribution centres, vast amounts of plastic and glass materials are still being wasted following usage by patients. Novo Nordisk are currently exploring new initiatives to solve the waste management issue. This includes product stewardship where circular processes are established to convert and recollect used products into valuable resources as well as developing new products that are based on circular principles that adhere to sustainable usage. However, plenty of potential still exists for further reusing and recycling product components by reshaping business practices.

Food for Thought: Revamping a Business Model

Reforming a tried-and-tested business model of a multibillion company such as Novo Nordisk can seem an immense task, and thus being able to think creative is crucial in achieving success in solving this case. To provide fertile grounds for the imagination to flow freely, we have collected a few examples of companies who have successfully adapted circular economy. The following companies display traits of the three pillars of Circular for Zero: Circular Supply, Circular Company and Circular Products.

Philips

Philips is a Dutch technology company operating in healthcare, consumer lifestyle and lighting. The firm is present in more than 100 markets worldwide and is a pioneer within the cradle-to-cradle business model. Within healthcare, refurbished medical imaging equipment is offered with full warranty, but at a reduced cost. The complex medical equipment is then returned to Philips via trade-ins. This has the dual benefit of supplying Philips with equipment for refurbishment and upgrading, while at the same time ensuring customers a good trade-in price for the used equipment. Within lighting, Philips has begun experimenting with circular business models in its lighting division, selling light as a service rather than a product. This means that Philips retain ownership of the materials, while the customer pays for maintenance and servicing. Because Philips retains ownership of the products and the embedded materials, the company is able to refurbish or recycle the lighting equipment once it is no longer wanted at the customer. Additionally, part of the value proposition is the fact that Philips is able to lower the energy usage by leveraging its employees' expert knowledge.



Mud Jeans

Mud Jeans is a Dutch fashion company who offers a range of apparel such as jeans, t-shirts, shirts, hoodies and bags. The business model of Mud Jeans is unique in the sense that customers are able to lease jeans and hoodies through a membership fee and a 12-month rent for each piece of clothing. At the end of the lease, the customer has three choices: Keep the item, get a new piece in exchange for the old one, or send it back. When returning a piece of clothing – whether leased or purchased – the customer receives a voucher for a later purchase at Mud Jeans. Furthermore, the company will repair any damaged clothes, and the consumer is offered a repair kit at the time of purchase to fix minor damages, thus potentially extending the lifetime of the product.

Grundfos

Grundfos is a pump manufacturer headquartered in Denmark, employing 18.000 people globally and with operations in more than 56 countries. In 2012, Grundfos initiated a take-back scheme for used circulators, wherein installers are invited to return the used circulators when replacing these in production facilities and homes. The defect pumps are then returned to the wholesaler and eventually returned to Grundfos, who subsequently pays the wholesaler, who in turn pays the installer. The scheme covers the Danish home market and has been developed in cooperation with wholesalers, with more than 200 currently partaking.

Closing remarks

Diabetes and obesity are increasing concerns for societies worldwide. This presents opportunities for Novo Nordisk to offer their solutions to an even greater number of people. However, markets are highly distinct and considerations and adaptation to social aspects play a key role in reaching these patients.

With sustainability being an unignorable factor of our time, Novo Nordisk is striving to become a frontrunner within their industry. This however requires re-thinking of existing business models and value propositions.

On this note, you are asked to develop out-of-the-box solutions to help Novo Nordisk maintain their leadership position, while exemplifying that value creation for patients, environmental considerations and profits are all possible at the same time. As you embark on this task, it is important that you clearly state assumptions made to secure implementable and feasible solutions aligned with Novo Nordisk' values. Your solutions will be judged on the following criteria: 30% for creativity of solutions in terms of new business models, 30% for environmental impact, 20% for financial feasibility of solutions and 20% adherence to SDGs.

“We have to acknowledge the fact that the world we operate in has changed, and we need to show the confidence, willingness and leadership to tackle bigger challenges than those we’ve faced in the past, this can seem a daunting task, but by sticking closely to the foundational values that have served us so well throughout our history, we can all think, talk and act like true leaders.”

Lars Fruergaard, CEO



Appendices

Appendix 1 – Financials

DKK million	2015	2016	2017	2018	2019	2018–2019
Financial performance						Change
Net sales	107,927	111,780	111,696	111,831	122,021	9%
Sales growth in constant exchange rates ¹	8.4%	5.5%	2.3%	4.6%	5.6%	
Net sales growth as reported	21.5%	3.6%	(0.1%)	0.1%	9.1%	
Operating profit	49,444	48,432	48,967	47,248	52,483	11%
Net financials	(5,961)	(634)	(287)	367	(3,930)	
Profit before income taxes	43,483	47,798	48,680	47,615	48,553	2%
Net profit for the year	34,860	37,925	38,130	38,628	38,951	1%
Total assets	91,799	97,539	102,355	110,769	125,612	13%
Equity	46,969	45,269	49,815	51,839	57,593	11%
Purchase of property, plant and equipment ¹	5,224	7,068	7,626	9,636	8,932	(7%)
Free cash flow ¹	34,222	39,991	32,588	32,536	34,451	6%
Financial ratios¹						
Percentage of sales:						
Gross margin	85.0%	84.6%	84.2%	84.2%	83.5%	
Operating margin	45.8%	43.3%	43.8%	42.2%	43.0%	
Net profit margin	32.3%	33.9%	34.1%	34.5%	31.9%	
Sales and distribution costs	26.2%	25.4%	25.4%	26.3%	26.1%	
Research and development costs	12.6%	13.0%	12.5%	13.2%	11.7%	
Administrative costs	3.6%	3.5%	3.4%	3.5%	3.3%	
Equity ratio	51.2%	46.4%	48.7%	46.8%	45.8%	
Return on equity	79.9%	82.2%	80.2%	76.0%	71.2%	
Cash to earnings	98.2%	105.4%	85.5%	84.2%	88.4%	
Payout ratio	46.6%	50.2%	50.4%	50.6%	50.5%	
Long-term financial targets¹						Target
Operating profit growth	43.3%	(2.0%)	1.1%	(3.5%)	11.1%	5%
Operating profit growth adjusted ²	35.2%	3.9%	1.1%	(3.5%)	11.1%	
Operating profit growth in constant exchange rates adjusted ²	12.7%	6.2%	4.8%	2.8%	5.6%	
Operating profit after tax to net operating assets	148.7%	150.2%	143.2%	116.7%	98.0%	80%
Cash to earnings (three-year average)	96.8%	102.4%	96.4%	91.7%	86.0%	85%

The Group has applied IFRS 16 'Leases' for the first time on 1 January 2019. Amounts for 2015-2018 have not been restated. Please refer to note 1.2.

1. See 'Financial definitions'. **2.** Years 2015 and 2016, adjusted for DKK 2,376 million from the partial divestment of associated company and DKK 449 million from the income related to the out-licensing of assets for inflammatory disorders respectively.

Appendix 2 - Diabetes and Obesity

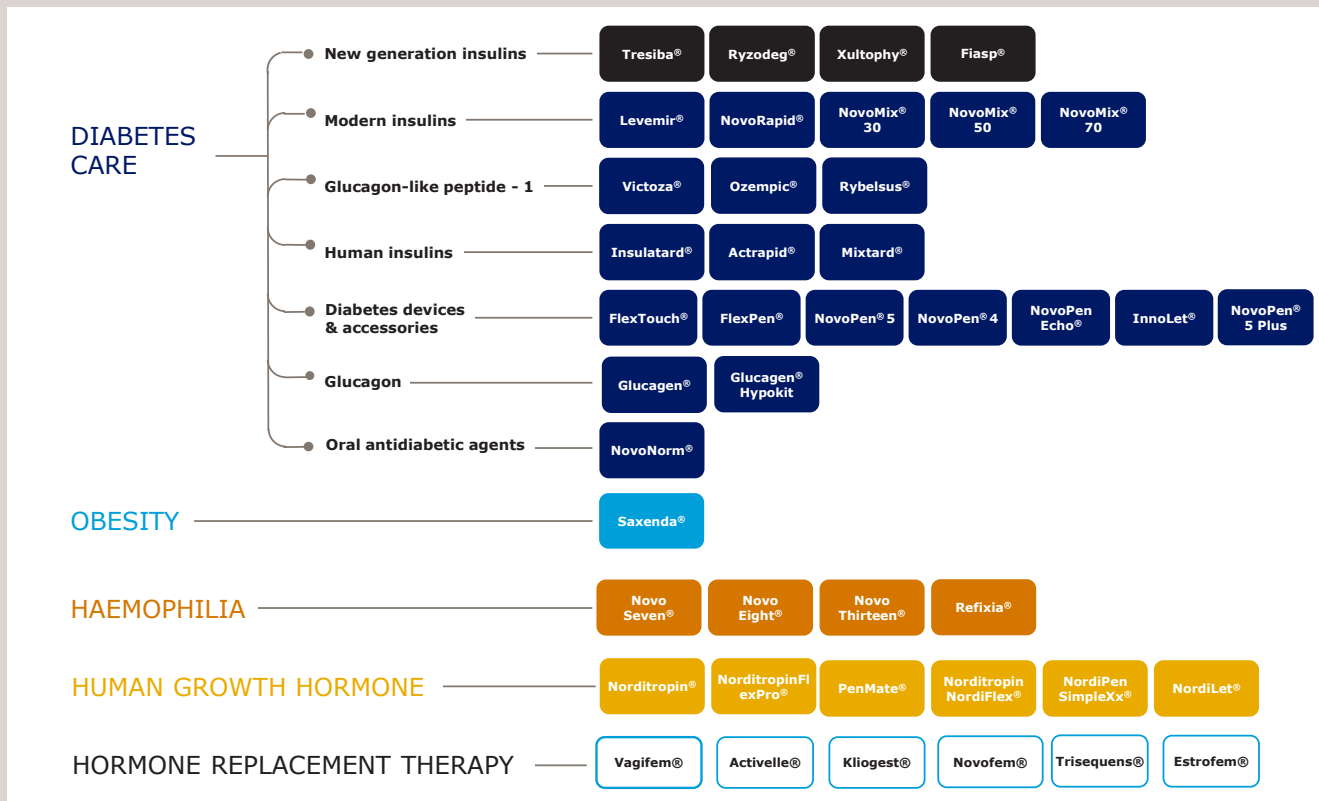
Diabetes occurs when the body is not able to produce insulin in sufficient amount, which then result in a too high blood-glucose levels. Glucose, a simple sugar, is obtained when carbohydrates from food and drinks are broken down in the digestive system. This glucose is released into the blood streams and is the body's main source of energy. Insulin is a hormone produced and secreted from the pancreas when the glucose-levels increase after the intake of food and drinks. Insulin is needed for the glucose to enter the cells and fuel the body, and naturally, the pancreas senses when glucose has been released into the bloodstream and produces the right amount of insulin to allow the glucose to enter the cells. However, in people living with diabetes, this system does not work properly. There are two types of diabetes, type 1 and type 2.

Type 1 diabetes is a serious chronic disease characterized by an autoimmune destruction of the insulin producing beta-cells in the pancreas leading to absolute insulin deficiency. People living with type 1 diabetes are depending on daily insulin injections to control their blood glucose level and delay or reduce diabetic complications and hard outcomes. Typical patients are all ages.

Type 2 diabetes is progressive serious chronic disease characterized by an increased level of blood glucose caused by increasing insulin resistance and falling pancreatic beta-cell function. Treatment of people living with type 2 diabetes depends on the stage of the disease. Initially, oral medication is often sufficient while progressed stages require GLP-1 and eventually insulin. A common cause for diabetes type 2 is obesity. Typical patients are elderly.

Obesity is classified by a BMI of 30 or greater. It is influenced by many factors including physiological, psychological, environmental, socio-economic and genetic. Obesity requires long-term management to delay or reduce the risk of long-term complications, such as type 2 diabetes.

Appendix 3 – Product Portfolio



Appendix 4 – Product Portfolio

Diabetes delivery systems

Insulin (durable) pens

NovePen Echo®



NovePen® 5

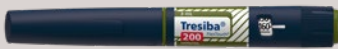


NovePen® 4



Pre-filled delivery systems

FlexTouch®, U100, U200



FlexPen®, U100, U200



InnoLet®



Needles

NovoFine Plus®, 32 Gauge



NovoFine®, 30 Gauge, 31 Gauge



NovoTwist®, 30 Gauge, 32 Gauge



NovoFine® AutoCover®



Other insulin delivery systems

PumpCart®, NovoRapid® cartridge to be used in pump.

Cartridge

Vial

Glucagon

GlucaGen®, glucagon

GlucaGen® Hypokit, glucagon emergency kit for severe hypoglycaemia.

Diabetes

Long-acting insulin

Tresiba[®], insulin degludec

Xultophy[®] *, insulin degludec/liraglutide

Levemir[®], insulin detemir

Premix insulin

Ryzodeg[®] 70/30, insulin degludec/ insulin aspart

Novomix[®] 30, biphasic insulin aspart

Novomix[®] 50, biphasic insulin aspart

Novomix[®] 70, biphasic insulin aspart

Fast-acting insulin

Fiasp[®], insulin aspart

NovoRapid[®] **, insulin aspart

NovoRapid[®] PumpCart[®], pre-filled insulin pump cartridge

Human insulin

Insulatard[®], human insulin

Actrapid[®], human insulin

Mixtard[®] 30, biphasic human insulin

Mixtard[®] 40, biphasic human insulin

Mixtard[®] 50, biphasic human insulin

Glucagon-like peptide-1

Victoza[®], liraglutide

Ozempic[®], semaglutide

Oral antidiabetic agents

NovoNorm[®], repaglinide

Obesity

Saxenda[®], liraglutide 3 mg

Appendix 5 - Cities Changing Diabetes

66% of people living with diabetes live in cities. Approximately 95% of the diabetes burden worldwide pertain to type 2 diabetes. The increasing number of people living with type 2 diabetes can be linked to various factors, including economic development, ageing populations, dietary changes and reduced physical activity – all of which can, to some extent, be linked to urbanization.

To develop interventions that can break the increasing number of diabetes, cities can prove to be of crucial importance. Understanding the form and constitution of cities, such as their size, diversity

and complexity, can present useful insight into understanding the drivers behind type 2 diabetes.

In 2014, Novo Nordisk, Steno Diabetes Center Copenhagen, and University College London launched Cities Changing Diabetes. As a platform partnership, it aims to address the social and cultural causes of diabetes in urban environments. Today, the programme involves local partnerships in more than 20 countries, working towards finding and sharing solutions to enhance healthy living in cities.



Mapping

In each city, the programme starts by generating a body of collective knowledge about urban diabetes. What's working today? Where are the challenges and priorities



Sharing

Continuously share what is learnt and connect the dots between cities. This enables everyone involved to gain from the experience and knowledge of others and create solutions for their own local needs.



Acting

All partners work to scale up solutions that target urban diabetes through health promotion and urban design to enable action through the programme.

Appendix 6 - Geographical Presence

Affiliates

To accommodate international business operations follows employment of workers at a global scale, in order to be close to negotiators and patients. 39% percent of Novo Nordisk's employees work in Denmark and 61% work in the rest of the world. The distribution of affiliates is as follows:

The employees working at affiliates are as well counted as FTEs*

- Africa, Asia, Middle East & Oceania: 7,482
- China & Taiwan: 4,885
- Denmark: 16,360
- Europe (excl. HQ): 4,175
- Japan (993) & Korea: 1,147
- Latin America: 2,005
- North America (US 5,785 & Canada 319): 6,104

FTE* = Full time equivalent.

Novo Nordisk employs more than 42,200 employees and they are divided into the following business areas:

Business area distribution

- 19% within research and development
- 33% in production and production administration
- 39% in international sales and marketing
- 9% in administration

Appendix 7 - Circular Economy

Looking beyond the current take-make-waste model, a circular economy is an economic system that, through elimination of waste and continual use of resources, seeks to redefine growth. It entails gradually decoupling economic activity from the consumption of finite resources and designing waste out of the system. A circular economy aims to rebuild capital, whether be financial, manufactured, human, social or natural. This ensures an enhanced flow of goods and services. The shift towards a circular economy involves a systematic shift that creates long-term resilience, generates business and economic opportunities, while providing benefits for the environment and society.

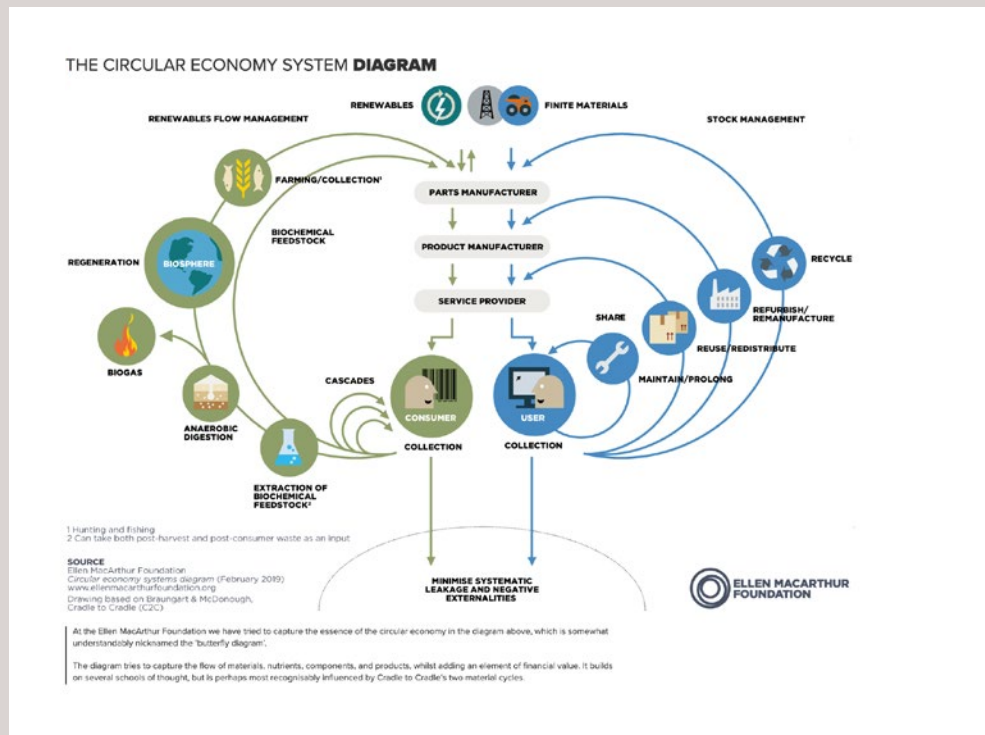
The model distinguishes between technical and biological cycles. Technical cycle recover and restore products, components and materials through processes such as reuse, repair, remanufacture or recycling. Biological cycles contain consumption in which food and biologically based materials are designed to feed back to the system through processes such as composting and anaerobic digestion. They provide renewable resources for the economy as they regenerate living systems.

The circular economy is built on three principles:

- Design out waste and pollution
- Keep products and materials in use
- Regenerate natural systems

These principles are illustrated on the figure below. Through these principles, waste and resource use is reduced, and when products reach the final stage of their lifecycle, they are used again to create further value.

Source: [Ellen MacArthur Foundation](https://www.ellenmacarthurfoundation.org/)



Appendix 8 – Pricing Position

The price of Novo Nordisk's products varies greatly from country to country and can be determined through one of three ways; negotiations between the pharmaceutical manufacturer and the government; the purchase of medicines by insurance companies or intermediaries on behalf of customers; or bulk purchases by governments through tender order where assorted companies are invited to submit their best bid.

The pricing of their products account for several factors, including what medical need the product fulfills for patients, how the clinical profile of the drug compares to other treatment options, the level of development in the local economy as well as how the pricing and reimbursement systems are in the given country.

To make the treatment of chronic diseased more accessible, Novo Nordisk has initiated [Access to Insulin Commitment](#) in the world's poorest countries. Through this programme, Novo Nordisk provides low-priced human insulin in vials at a ceiling price of USD 4.00 (as of 2019) to Least Development Countries (LDC), other low-income countries and selected organisations providing relief in humanitarian settings.

Novo Nordisk is looking for new outcomes-based pricing models, reflecting the true value of their medicine. New pricing models may be different from one disease to another, but they should all adhere to the following principles:

- Innovation is rewarded based on the value offered to patients
- Value is defined as the outcomes achieved relative to the costs
- Outcomes are measured through health data and real-world evidence

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