The Russian Federation has made great improvements in healthcare in recent years. However, the challenge of diabetes continues to grow. Through continued investment and collaboration with partners, Novo Nordisk is committed to helping people with diabetes and reducing the social and economic impact of the condition.
This case study documents how we in partnership can make a significant contribution to addressing the rising diabetes challenge in Russia by investing in local knowledge and capacity building. It is our proposal on how we can create value together.

Diabetes is a serious, chronic health condition that can negatively impact people's quality of life due to related complications.

With 4 million people diagnosed with diabetes in Russia and even more who are undiagnosed, diabetes represents a significant cost to society. Today, diabetes-related complications account for a significant portion of the total direct cost of diabetes care in Russia.

Russia has made great improvements within healthcare and is now focused on strengthening the pharmaceutical industry. The aim is a significant increase in locally produced pharmaceuticals by 2020.

As a leader in diabetes care, we are investing in Russia to ensure availability of high-quality insulin for the more than 467,000 people who depend on our products every day. In the beginning of 2015 we started local production of insulin at the first and only greenfield manufacturing facility for modern insulin in Russia. Greenfield refers to an investment in a manufacturing structure that is built in an area where no previous facilities for the same type of manufacturing exist. With our long history in diabetes care, we bring a wealth of experience on how to collaborate with partners to change diabetes and improve patient outcomes.

If together we could improve control of diabetes in Russia, bringing the average HbA1c level down with one percentage point and thereby reducing complications, 1.5 billion US dollars could be saved in healthcare expenditures.

Uniting in a collaborative effort to change the diabetes situation in Russia, we welcome the opportunity to help people with diabetes live healthier lives in the future.

External reviewer
Professor Marina V Shestakova, MD, PhD, Director of Diabetes Institute, Federal Endocrinology Research Center, Moscow, has been an external reviewer on this case study. We are grateful for her review and expert guidance.
The burden of diabetes

With every passing year, diabetes affects more people. Today, 4 million people are diagnosed with diabetes in Russia and up to 6 million people are unaware of their condition. In social and economic terms, diabetes can be costly, as poor diabetes control can lead to debilitating complications, excess costs for the healthcare system and premature death.

Diabetes is a chronic condition that occurs when the body cannot produce enough insulin or use the insulin that is produced correctly\(^1\) (Box 1). Undiagnosed or poorly controlled diabetes can lead to a number of complications that are costly to treat and negatively impact people’s productivity and quality of life.\(^1\)

Obtaining an accurate picture of the diabetes situation in a country is key to identifying opportunities to address it. The Rule of Halves\(^2\) is a model that estimates a global average of the diabetes situation. While conditions vary from country to country, according to the rule, 50% of people with diabetes are diagnosed and only a small number reach desired outcomes and live free from diabetes-related complications.

In Russia, the Rule of Halves shows that there are opportunities to improve prevention, increase diagnosis rates and scale up efforts to help people achieve treatment targets and live without complications. In Russia, there are more than 4 million people diagnosed with diabetes.\(^3\) However, studies suggest that the actual number of people with diabetes is higher, amounting to 9–10 million people.\(^3\) This means that up to 60% of people with diabetes are not aware of their condition and do not receive care. While all people diagnosed with diabetes receive care, the Rule of Halves suggests that only 15% achieve treatment targets and as few as 8% live without complications (Figure 1).

THE HEALTH BURDEN OF DIABETES
Due to complications, people with diabetes have nearly double the risk of premature death than people without diabetes.\(^4\) In fact, more than 66,000 people die from diabetes-related causes every year in Russia.\(^5\)

Reducing HbA\(_1c\) levels, a measure of blood sugar control, and achieving individual treatment targets (Box 2), are key to reducing complications (Figure 2) and associated costs.

---

**FIGURE 1 85% OF PEOPLE WITH DIABETES DO NOT ACHIEVE TREATMENT TARGETS**

Russia and the Rule of Halves\(^1,3,5\)

<table>
<thead>
<tr>
<th>People with diabetes</th>
<th>Of whom 4 million are diagnosed</th>
<th>Of whom all receive care</th>
<th>Of whom achieve treatment targets</th>
<th>Of whom about 50% live without complications*</th>
</tr>
</thead>
<tbody>
<tr>
<td>9–10 million</td>
<td>100%</td>
<td>40%</td>
<td>40%</td>
<td>15%</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

*Number of people living without complications builds on assumptions from the Rule of Halves.\(^2\)

**BOX 1 DIABETES – A LIFELONG CONDITION**

There are two main types of diabetes: type 1 and type 2. Type 1 diabetes often occurs at a young age. It is a lifelong disease where the body no longer produces insulin. More common is type 2 diabetes, which accounts for around 95% of all cases of diabetes.\(^1\) People with type 2 diabetes may still produce insulin, but either they do not produce enough or the body cannot use the insulin correctly. Insulin helps sugar to enter the cells; failing this, sugar builds up in the bloodstream. Most of the long-term health complications associated with diabetes are due to persistently high blood sugar levels, which can result in a number of severe complications (Figure 2).

**BOX 2 INDIVIDUAL TREATMENT TARGETS FOR MANAGING DIABETES**

According to the National Standards of Diabetes Care for Russia, individual blood sugar target levels are determined according to age and presence of severe complications.\(^3\) In practice, this means that a young person with no existing complications should strive to achieve a blood sugar level close to the level of a person without diabetes. Patients of a higher age or with existing complications have less strict targets to avoid extreme low blood sugar events.
THE ECONOMIC BURDEN OF DIABETES

The cost of providing treatment and care for people with diabetes can be considerable and can be an unsustainable challenge to future healthcare services.\(^1\)

The total direct annual cost of diabetes in Russia is estimated to be 12.5 billion US dollars\(^A\), of which 91% is associated with the treatment of diabetes-related complications, outpatient services, hospitalisation and other care (Figure 3).\(^5\) Already at the point of diagnosis, up to 50% of people with diabetes have microvascular complications such as vision loss and kidney disease.\(^5\)

42% 9%
49%
of the direct cost of diabetes is associated with treatment of diabetes-related complications
of the direct cost is associated with medications to control blood sugar levels
of the direct cost is associated with hospitalisation, outpatient services and other care

OF PEOPLE WITH NEWLY DIAGNOSED DIABETES HAVE ONE OR MORE COMPLICATIONS\(^5\)

In 2010, the Federal Targeted Programme on Diabetes concluded that there are significant savings to be made by diagnosing diabetes and treating complications earlier. For example, treating vision loss, a common diabetes-related complication (Figure 2), in the early stages costs 50 times less than treating it after it has progressed far enough to warrant a surgical procedure to restore vision.\(^5\)

\(40–50%\) of people with newly diagnosed diabetes have one or more complications\(^5\)

A. Cost is cited by the source as 12.5 billion US dollars equalling 375 billion roubles.\(^5\)

The challenge

**FIGURE 2 IF UNCONTROLLED, DIABETES CAN LEAD TO A NUMBER OF SEVERE COMPLICATIONS**

**STROKE**
Diabetes increases the risk of stroke by 2.3 times\(^6\)

**SEVERE VISION LOSS**
Diabetic retinopathy is the leading cause of vision loss in working-age adults\(^7\)

**CARDIOVASCULAR DISEASE**
Diabetes is associated with a twofold risk of heart disease and heart attack\(^6\)

**KIDNEY FAILURE**
Every third patient with diabetes has kidney disease\(^8\)

**AMPUTATION**
Diabetes is a leading cause of non-traumatic lower-limb amputations\(^5\)
DRIVERS OF THE DIABETES EPIDEMIC

Since 2006, the total number of people in the Russian State Registry of Diabetic Patients has increased by 60% (Figure 4). Estimates suggest that the number of people diagnosed with diabetes will reach 5.8 million by 2030.

The increasing prevalence of type 2 diabetes is driven by several factors – many of which have to do with change in lifestyle and the environment in which people live.

Diabetes and an ageing population
The risk of developing type 2 diabetes increases with age. In recent years, life expectancy in Russia has increased by five years, bringing life expectancy at birth to over 70 years. This means that more people are at increased risk of developing diabetes.

Diabetes and urbanisation
Urbanisation – which affects lifestyles and increases exposure to risk factors such as mechanised transport, insufficient physical activity and changing diets – is associated with an increased risk of developing type 2 diabetes. Today, 74% of the Russian population lives in urban environments.

Diabetes and obesity
Being overweight or obese puts pressure on the body’s ability to properly adjust blood sugar, thereby increasing the risk of diabetes by up to 20 times.

Already 26% of the population over the age of 15 in Russia is obese. Estimates suggest that this will also be a challenge for public health in the future, as 30% of the population will be obese in 2030 (Figure 5).
A healthcare system under reform

Russia has made great advances in the provision of healthcare, and now the country is focusing on strengthening the local pharmaceutical industry to secure access to innovative medicines for the people who depend on them every day.

Over the past two decades, the Russian Federation has been committed to implementing a new social policy. Universal health coverage and strengthening of the local pharmaceutical industry are important components of this policy.15

In 2005, modernisation of Russia’s healthcare system was brought to the forefront of the political agenda by the Russian president. Issues in focus were extension of life expectancy and improvement of the quality and availability of free medical care. Reforms have also resulted in a number of actions to address the diabetes situation in the country (Box 3). A STRATEGY TO STIMULATE THE RUSSIAN PHARMACEUTICAL INDUSTRY

In 2009, the Russian Federation initiated the Strategy Pharma 2020.16 The strategy is designed to aid the transition of the pharmaceutical industry to a more innovative model and make the country less reliant on imports. The objective of the strategy is to secure access to innovative medicines for the population and create jobs by ensuring that 50% of pharmaceuticals sold locally are manufactured in Russia by 2020 (figure 6).16

FIGURE 6 50% OF PHARMACEUTICALS SOLD SHOULD BE LOCALLY PRODUCED IN 2020

Strategy Pharma 2020: percentage of pharmaceutical imports versus local production, 2009 and 202016

Box 3: A foundation for improving diabetes care in Russia

The Russian Federation has taken several steps towards building a foundation for the provision of diabetes care. From 1996 to 2002, the Federal Targeted Programme on Diabetes, a 198 million US dollar initiative, was launched to improve prevention efforts and decrease the prevalence of diabetes and diabetes-related complications.3 From 2002 till 2012, a sub-programme on diabetes has been adopted within the framework of the Federal Targeted Programme on Diabetes. This sub-programme has been included into the Federal Targeted Programme ‘Prevention and fight against socially important diseases’ since 2007. The programme introduced the Russian State Registry of Diabetic Patients for monitoring quality of care and the national diabetes situation.

A. Cost is expressed in US dollars and has been converted from 6.1 billion roubles at the rate of USD 1 = RUB 30.8, the standard rate for 2002.
Challenges in diabetes care

The right to health has been valued and protected in international and regional human rights treaties as well as national constitutions all over the world. Novo Nordisk’s approach to good diabetes care is rooted in the right to health and focused on addressing key barriers to diabetes care.

The Universal Declaration of Human Rights defines the right to health as being essential for an adequate standard of living.\(^\text{17}\) Four key elements shape the right to health: availability, accessibility, affordability and quality for patients. The World Health Organization identifies awareness as a fifth critical element.\(^\text{18}\) Together, these elements form a framework, representing five challenges that all need to be addressed to ensure good diabetes care for the patient (Figure 7).

FOCUS OF THIS CASE STUDY

This case study focuses on three of the areas that could be addressed to strengthen diabetes care in Russia (Figure 7). These are areas where, in collaboration with partners, Novo Nordisk can have the greatest positive impact for people with diabetes. For each, we illustrate how we are working to change diabetes in Russia.

Raising diabetes awareness

We collaborate with stakeholders at federal and regional levels to improve diabetes awareness. This supports prevention by making people aware of the risk factors and provides a screening opportunity for people who are unaware of their diabetes condition.

Improving access to diabetes knowledge

We improve access to diabetes care knowledge by enhancing the skill level of healthcare professionals to support their work in providing treatment and care. For people with diabetes, we make information available to foster greater understanding, which enables them to take control of their condition.

Ensuring availability of high-quality locally produced insulin

We invest in clinical research and development in Russia, which generates the basis for developing safe and efficient innovative products that meet patient needs. Through our investment in a modern insulin manufacturing facility in Kaluga, we are bringing new technology and skills to Russia, and contributing to a steady supply of insulin for people with diabetes.

Challenges related to affordability and quality for patients are not directly addressed in this case study – however, all elements of the framework (Figure 7) are interlinked and many of our highlighted activities therefore affect these too. One example is the Changing Diabetes® Bus (see page 10). The bus has brought diagnostic services closer to people and thus reduced expenses for individuals related to travel and time off work. At the same time, it has actively contributed to the collection of data on diabetes for the Russian State Registry of Diabetic Patients, enabling benchmarking of the diabetes challenge and quality of care.

FIGURE 7 CHALLENGES IN DIABETES CARE WHERE WE CAN HAVE THE GREATEST POTENTIAL IMPACT

- Raising diabetes awareness
- Improving access to diabetes knowledge
- Ensuring availability of high-quality locally produced insulin

The right to health has been valued and protected in international and regional human rights treaties as well as national constitutions all over the world. Novo Nordisk’s approach to good diabetes care is rooted in the right to health and focused on addressing key barriers to diabetes care.
Our value proposition

At Novo Nordisk, we put the patient at the centre of everything we do. We believe that what is good for people with diabetes is good for society and our company. We collaborate with a range of partners to develop and implement solutions that can improve outcomes for people with diabetes.

Novo Nordisk has a values-based management system formalised in the Novo Nordisk Way (Box 4). This is who we are, where we want to go and how we work. An element of the Novo Nordisk Way is the Triple Bottom Line business principle. It states that we conduct our activities in a financially, socially and environmentally responsible way.

In conducting our business activities with a focus on patient and social needs, we are able to create value for all parties, including Novo Nordisk. We call this creating shared value (Figure 8).

**CHANGING DIABETES IN PARTNERSHIP**

Diabetes is a complex condition requiring more than medicine to avoid complications and achieve a good quality of life. The diabetes challenge is of a magnitude that makes it impossible for any single party to have a significant impact and improve the outcomes for the millions of people with diabetes.

Changing Diabetes® is our response to the global diabetes challenge. It is our purpose and company mission. Together with our partners, we work to raise awareness and improve access to care.

We believe it is important for private companies, non-governmental organisations and public institutions to work together and apply their unique strengths in addressing the diabetes challenge.

Therefore we collaborate with partners to develop solutions that address the diabetes challenge. A good example of this is the aforementioned Changing Diabetes® Bus in Russia (see page 10). The project is a multi-stakeholder collaboration to bring diabetes care closer to people and build an understanding of diabetes in Russia.

**BOX 4 THE NOVO NORDISK WAY**

Today, our employees across the world have the passion, the skills and the commitment to prevent, treat and ultimately cure diabetes.

- Our ambition is to strengthen our leadership in diabetes.
- Our key contribution is to discover and develop innovative biological medicines and make them accessible to patients throughout the world.
- We aspire to change possibilities in haemophilia and other serious chronic conditions where we can make a difference.
- Growing our business and delivering competitive financial results is what allows us to help patients live better lives, offer an attractive return to our shareholders and contribute to our communities.
- We never compromise on quality and business ethics.
- Our business philosophy is one of balancing financial, social and environmental considerations – we call it ‘The Triple Bottom Line’.
- We are open and honest, ambitious and accountable, and treat everyone with respect.
- We offer opportunities for our people to realise their potential.

**FIGURE 8 WE BELIEVE THAT WHAT IS GOOD FOR PEOPLE WITH DIABETES IS GOOD FOR SOCIETY AND FOR NOVO NORDISK**
Our history

Our commitment to Russia dates back to 1924. Since then, we have continuously invested in improving patient outcomes.

Novo Nordisk has more than 90 years’ experience in serving people with diabetes with innovative products. Based in Denmark, we are a leading diabetes-focused biotech company, employing 41,450 people worldwide and marketing products in 180 countries.19

A letter from 1924 from the chairman of the Academic Medical Council of the People’s Commissariat of Public Health initiated Novo Nordisk’s first activities in Russia. The letter stated that it was necessary to import insulin and specifically recommended insulin from Novo Nordisk. Ever since then, we have been providing insulin to Russian patients (Figure 9). In 1991, we established an affiliate in Moscow. And today we have regional offices in St Petersburg, Rostov-on-Don, Samara, Omsk, Krasnoyarsk and Vladivostok as well. Over the past decade, the number of people we employ in Russia has increased sixfold. Today, we employ more than 380 people in the country (Figure 10).20

In Russia, we provide insulin to more than 467,000 people with diabetesA,20 and have a full portfolio of insulin with more than 50% of the modern insulin market measured in volume21.

**FIGURE 9 MILESTONES IN THE HISTORY OF NOVO NORDISK IN RUSSIA**

- 1924 Export of insulin
- 1991 Novo Nordisk affiliate established
- 2002 Launch of rapid-acting modern insulin
- 2006 Launch of the Changing Diabetes® Bus
- 2008 ‘Unite to Change Diabetes’ Leadership Forum in Moscow
- 2009 St Petersburg regional diabetes leadership forum
- 2012 Ground-breaking for modern insulin manufacturing facility in Kaluga
- 2014 Government of Vologda Oblast and Novo Nordisk sign cooperation agreement
- 2015 Inauguration of the first and only greenfield manufacturing facility for modern insulin in Russia

**FIGURE 10 SIXFOLD INCREASE IN THE NUMBER OF EMPLOYEES OVER THE PAST DECADE**

Number of Novo Nordisk employees in Russia, 2005–201420

<table>
<thead>
<tr>
<th>Year</th>
<th>Employees</th>
</tr>
</thead>
<tbody>
<tr>
<td>2005</td>
<td>57</td>
</tr>
<tr>
<td>2010</td>
<td>208</td>
</tr>
<tr>
<td>2014</td>
<td>383</td>
</tr>
</tbody>
</table>

**NOTE:** Number of employees in 2014 are as of November 2014.

A. The number is estimated based on average dose as recommended by the World Health Organization.
Raising diabetes awareness

Raising public awareness of diabetes and its risk factors can contribute to curbing the growth in prevalence of diabetes in the future and help people with undiagnosed diabetes to access treatment and care.

Evidence suggests that early diagnosis and treatment improves the long-term health prospects of a person with diabetes by preventing or delaying the onset of complications. However, in Russia more than 60% of people with diabetes are unaware that they have it. Today, 40–50% of people with diabetes have a diabetes-related complication at the time of diagnosis.

Raising the overall awareness is critical to addressing the diabetes challenge. If people understand the risk factors for developing type 2 diabetes, they can make lifestyle changes and reduce the risk of developing diabetes. Knowing the symptoms could encourage people to seek advice from a doctor as soon as they suspect they may have diabetes.

PATHS TO VALUE CREATION

In a country as vast as Russia, reaching people with information about diabetes and providing access to diagnosis can prove challenging. For almost two decades, Novo Nordisk has been working through partnerships at federal and regional level to improve access to information and diagnostic services.

Bringing information and services closer to people

In 2002, together with the Federal Ministry of Health, the Federal Endocrinology Research Centre, regional administrators and regional chief endocrinologists, we launched the Changing Diabetes® Bus. The bus provided screening and diagnosis options as well as basic diabetes services to people in urban and rural areas under the umbrella of the Federal Targeted Programme on Diabetes. The bus promotes awareness and collects data to improve the understanding of the diabetes situation in Russia.

FIGURE 11 THE CHANGING DIABETES® BUS VISITED 58 CITIES ACROSS THE COUNTRY IN 2014

Cities visited by the Changing Diabetes® Bus, 2011–2014

The Changing Diabetes® Bus on tour raising awareness, Novocheboksarsk, 2010
The bus has visited an increasing number of cities (Figure 11) and as of 2014, more than 148,000 people have been screened across 30 regions, 8,200 people with diabetes who were previously unaware of their condition have been diagnosed, and many more have learned about diabetes and its risk factors.20

Preventing and treating diabetes at regional level
In Russia, the regions deliver healthcare. Novo Nordisk collaborates with the regions to strengthen diabetes care and improve access to information about diabetes.

In the Vologda region, we are cooperating with the regional government to establish diabetes centres in two cities as well as a mobile clinic. Our key contribution is diabetes expertise and training of doctors. Since 2014, 18 endocrinologists have participated in training at the Steno Diabetes Center in Denmark (Box 5).

Another example of our close collaboration is in the Kaluga region. In 2012, Novo Nordisk entered into a collaboration with the Governor of Kaluga on a programme called ‘Prevention of diabetes is the way to keep nation’s health’. The programme includes social projects for people with diabetes, prevention campaigns and promotion of screening.

In addition to building a modern insulin manufacturing facility in the Kaluga region (see pp 14–15 and 18–19), we are also a member of the Kaluga Pharmaceutical Cluster. This is a non-commercial partnership that seeks to accelerate the commercialisation of scientific research and pharmaceutical production in the region.

Uniting stakeholders
Improving patient outcomes is both a political and a practical challenge that calls for action from all stakeholders. In 2008, we supported the Russian Diabetes Federation and the International Diabetes Federation in holding a multi-stakeholder diabetes leadership forum. The Moscow forum gathered 300 stakeholders, including members of government and international and local experts and media to discuss ways of preventing diabetes and improving diagnosis and treatment.23

The forum resulted in the ‘Unite to Change Diabetes’ resolution23, which outlines actions to address the national diabetes challenge, including a call to raise public awareness of risk factors, methods of early detection and prevention and promotion of healthy lifestyles. The Moscow forum was followed up by a regional forum in St Petersburg in 2009 to discuss regional implementation of the Moscow resolution.

**BOX 5 STENO DIABETES CENTER**
Steno Diabetes Center is an internationally recognised institution with more than 80 years of experience within diabetes care and research. The centre is a not-for-profit organisation owned by Novo Nordisk A/S and is working in partnership with Denmark’s healthcare system, treating more than 5,000 patients with diabetes every year. Internationally, Steno delivers education and training of healthcare professionals in areas as prevention, diagnosis and treatment of diabetes.
Improving access to diabetes knowledge

A solid understanding of diabetes treatment and care is important – both for people with diabetes and for healthcare professionals. It is the cornerstone of diabetes management and controlling blood sugar levels to avoid complications.

Despite great strides in the treatment of diabetes (Figure 13), many people still find it challenging to manage their diabetes. The chronic nature of diabetes, the complexity of its management (Box 6) and the daily decisions required mean that people with diabetes need ongoing guidance and support.

PATHS TO VALUE CREATION

Novo Nordisk has a long history of working to improve understanding of patient needs, strengthen delivery of patient education and diabetes information and expand healthcare professionals’ knowledge of diabetes.

Understanding the psychosocial issues and needs

To manage diabetes successfully, multiple physiological and psychosocial factors need to be taken into account.

In 2012, Novo Nordisk, together with partners, conducted the DAWN2™ study (Box 7) to understand the needs of people with diabetes. The study surveyed 910 Russian people with diabetes, family members and healthcare professionals providing care to people with diabetes.24

Key findings from the survey in Russia include low levels of participation by people with diabetes and their families in diabetes education as well as healthcare professional and patient concerns related to intensive diabetes treatment.25-27

63% of people with diabetes have not participated in any diabetes education25

Supporting access to information

Patient education is part of the foundation for enabling people with diabetes to effectively manage their condition. In addition, it has been shown to be effective for improving clinical and psychosocial outcomes for people with diabetes.28

Russia has a network of 70 diabetes centres and more than 1,100 diabetes schools across the country, which are funded by the federal government5. Novo Nordisk supports these centres and schools with training and information materials to improve patient education.20 The materials deal with a wide range of topics and issues ranging from basic information on the nature of diabetes to guidance on using insulin.

> 81,000 PIECES OF PATIENT EDUCATION MATERIALS PRODUCED AND DISTRIBUTED20

Upgrading healthcare professionals’ diabetes knowledge

In Russia, endocrinologists are the main point of contact for diabetes treatment and care. They provide expert advice and play a vital role in helping patients achieve treatment targets.

Ensuring that endocrinologists have the necessary information and skills to support people with diabetes is critical.

BOX 6 MANAGING DIABETES

People with type 1 diabetes need to start taking insulin as soon as they are diagnosed and must continue to do so for the rest of their lives. For people with type 2 diabetes, lifestyle changes, including diet and exercise, and one or more oral medicines may be sufficient to control the condition. When treating diabetes, the goal is to reduce and stabilise blood sugar to, or near, the level of a person without diabetes. If treatment targets are not met, insulin may be added to balance blood sugar levels round the clock. If targets are still not achieved, intensive insulin treatment may be necessary.

BOX 7 DAWN2™ – A GLOBAL STUDY EXPLORING THE UNMET NEEDS OF PEOPLE WITH DIABETES

With more than 15,000 people participating across 17 countries, DAWN2™ is the largest study ever conducted to understand the psychosocial issues and needs of people with diabetes. The DAWN2™ study is the first of its kind to take a 360° approach to understanding diabetes, interviewing not only people with diabetes, but also family members, nurses, dieticians, general practitioners and specialists. The study was conducted as a collaboration between the International Diabetes Federation, the International Alliance of Patient’s Organizations, Novo Nordisk and others.
According to the DAWN2™ study, another challenge connected with diabetes education in Russia is doctor and patient concerns about intensive diabetes treatment, especially when the time may come to begin insulin therapy.27,29

Among patients, there can be many reasons for their concerns, including perceived loss of control, while doctors may be deterred by the prospect that insulin therapy will require careful monitoring and good understanding of the treatment by the patient.31,32 Other available personnel, such as diabetes educators and nurses, could be enlisted to provide guidance and support with starting people with diabetes on insulin when needed.

Since 2011, Novo Nordisk has through partnerships supported 21,410 training sessions for both endocrinologists and general practitioners (Figure 12).20 Training and education range from general diabetes treatment practices to treatment intensification and take the form of symposiums, roundtable meetings, workshops and one-on-one training sessions. Post-training surveys indicate that healthcare professionals found the training very relevant.20

![Histogram](image-url)

**FIGURE 12 21,410 HEALTHCARE PROFESSIONAL TRAINING SESSIONS**
Healthcare professional training sessions, 2011–201420

According to the DAWN2™ study, another challenge connected with diabetes education in Russia is doctor and patient concerns about intensive diabetes treatment, especially when the time may come to begin insulin therapy.27,29

Among patients, there can be many reasons for their concerns, including perceived loss of control, while doctors may be deterred by the prospect that insulin therapy will require careful monitoring and good understanding of the treatment by the patient.31,32

Other available personnel, such as diabetes educators and nurses, could be enlisted to provide guidance and support with starting people with diabetes on insulin when needed.
Ensuring availability of high-quality locally produced insulin

Our investment in clinical research and development and the first and only greenfield manufacturing facility for modern insulin in Russia aims to lay a path for innovation that can lead to improved solutions for people with diabetes.

Due to the progressive nature of diabetes, insulin therapy is often inevitable for people with diabetes. Insulin is recognised as an essential medicine in Russia and by the World Health Organization. In Russia, all people with type 1 diabetes and over 20% of people diagnosed with type 2 diabetes depend on insulin every day to control their blood sugar levels and reduce the risk of developing complications.

Making medicines available to people with diabetes is therefore essential for improvements in health status and life expectancy. However, even people who have access to medicines face challenges in managing their diabetes. This is in part due to dynamic lifestyles and the complexity of following a diabetes treatment regimen.

Innovative diabetes treatments that address convenience and barriers to adherence such as concerns of extreme low blood sugar events can benefit patients. Such innovations could include insulin that requires fewer injections or can be dose-adjusted with meals (Figure 13). Studies have demonstrated that the use of modern insulin can result in reductions in blood sugar levels and fewer complications with better long-term outcomes for people with diabetes.

PATHS TO VALUE CREATION
Through clinical trials, we ensure that the innovative medicines we develop are safe and efficient and meet patient needs. By building a high-tech manufacturing facility in Russia, we are bringing our products and knowledge closer to the people who depend on them.

Ensuring safe and efficient medicine through clinical trials
Novo Nordisk invests in innovation to meet patient needs through research and development (R&D). Over the last five years, we have invested between 14% and 15.8% of our annual global sales in R&D activities.

25% OF ALL INDUSTRY-SPONSORED DIABETES CLINICAL TRIALS IN RUSSIA OVER THE LAST THREE YEARS HAVE BEEN CONDUCTED BY NOVO NORDISK

Clinical research and development is an integral and a required part of developing medicines to meet the needs of patients, but it can also create a foundation for improved local R&D capabilities. Medical research is not part of the educational curriculum for many medical students. Clinical research and development can fill this gap and strengthen research capabilities. A recent Novo Nordisk study on the value of diabetes clinical research reports that 76% of healthcare professionals believe that industry-sponsored clinical trials contribute to improvements in clinical research conduct. In addition, 75% of healthcare professionals say that clinical trials enhance their patient care competencies.
Over the past three years, Novo Nordisk has conducted one fourth of all industry sponsored diabetes clinical trials in Russia.\textsuperscript{36} In addition, we have brought knowledge of a new-generation diabetes treatment to the 12 research sites across Russia, where we were the first to conduct phase 3 clinical trials.\textsuperscript{38}

Bringing production of quality medicines closer to people

Manufacturing insulin is different from many other pharmaceutical products. It requires large investments in biotechnology, sterile production facilities and an understanding of working with living cells – in this case yeast – to produce a uniform and pure product.

Novo Nordisk’s highly efficient production system is based on years of experience and learning from best practices. The company has continuously developed production through technology upgrades, skill building and process optimisation.

In 2012, Novo Nordisk began the construction of a new 100 million US dollar modern insulin manufacturing facility in the Kaluga region of Russia (see pp 18-19).\textsuperscript{39} This is the first and only greenfield manufacturing facility (Box 8) for modern insulin in the country. The facility will formulate and fill Novo Nordisk modern insulin for the Russian market.\textsuperscript{39}

In addition to the initial investment in building the manufacturing facility, the facility will create jobs and attract national and international expertise. As with all Novo Nordisk manufacturing facilities, the facility in Kaluga will adhere to local and international Good Manufacturing Practices\textsuperscript{A}. All people employed at the facility have been trained in the production of medicines according to these regulations.

**BOX 8 GREENFIELD MANUFACTURING FACILITY**

The greenfield concept refers to investment in a manufacturing structure that is built in an area where no previous facilities for the same type of manufacturing exist. The manufacturing facility in Kaluga has been built from scratch and incorporates new technology.

\textsuperscript{A} Good Manufacturing Practices are the practices required to conform to guidelines recommended by agencies that control authorisation and licensing for the manufacturing and sale of food, drug products and active pharmaceutical ingredients.

**FIGURE 13 INNOVATION WITHIN INSULIN TREATMENT FOR THE BENEFIT OF THE PATIENT\textsuperscript{40,41}**

1921

Life-saving isolation of animal insulin

1973

Higher purity of animal insulin

1980s

Human insulin production in yeast cells: fewer allergic reactions and increased certainty of supply

2000s

Longer mode of insulin action and less variability, more stable control of blood sugar

Mix of long- and rapid-acting insulin, requiring fewer injections

Rapid-acting insulin injected immediately before a meal: flexible lifestyle and increased quality of life

2010s

New-generation insulin with lower risk of extreme low blood sugar events and greater flexibility

**Future**

Many people with diabetes hope for a future that includes oral insulin, once-weekly insulin or even a cure
Our biggest contribution to society is our innovative quality products. Making these available to people who need them is how we create value. This is why we have an ambition to reach 40 million people with our diabetes care products by 2020.19

**ADDRESSING CHALLENGES WITHIN DIABETES CARE**

In Russia, we have already seen what can be achieved when collaborating with local stakeholders. Achievements include:

- Screening of more than 148,000 people for diabetes and diagnosis of 8,200 people.
- 21,410 training sessions for healthcare professionals to improve access to diabetes care knowledge.
- Conducting one fourth of all industry-sponsored diabetes clinical trials in the past three years.
- Building the first and only greenfield manufacturing facility for modern insulin in Russia, bringing us closer to the people who depend on our products.

**VALUE OF IMPROVED DIABETES CONTROL**

Improving diabetes control is possible when stakeholders collaborate. This has already been demonstrated in Russia, where great improvements in the control of diabetes have been achieved by the Federal Targeted Programme on Diabetes. Between 2006 and 2011, the average HbA1c level in people with type 2 diabetes declined from 8.56% to 8.12%. The level of diabetes-related complications has followed this trend, resulting in healthcare savings of almost 212 million US dollars.A,5

Calculations show that reducing the average HbA1c level in people with diabetes by 1 percentage point could lead to a significant reduction in complications. For example, 9% fewer kidney failures and 7% fewer cases of severe vision loss. By reducing complications, society could save more than 1.5 billion dollars in healthcare expenditure (Figure 14).C

**Figure 14 1.5 Billion Dollars Could Be Saved by Reducing Complications for People with Diabetes in Russia Today**

<table>
<thead>
<tr>
<th>HbA1c</th>
<th>8.12%</th>
</tr>
</thead>
<tbody>
<tr>
<td>20,000 fewer cases of kidney failure</td>
<td></td>
</tr>
<tr>
<td>96,000 fewer cases of severe nerve damage</td>
<td></td>
</tr>
<tr>
<td>19,000 fewer cases of severe vision loss</td>
<td></td>
</tr>
</tbody>
</table>

**VALUE OF JOB CREATION**

Our contribution to the Russian society extends beyond people living with diabetes and our more than 380 employees. Based on economic impact modelling, we estimate that for every job at Novo Nordisk Russia, an additional 4 jobs are created outside Novo Nordisk in the surrounding economy through suppliers and household consumption.

By raising our employees’ competencies and teaching them to work according to Good Manufacturing Practices, we are putting skills in place that can enhance the development of the Russian pharmaceutical industry.

> 1,500 JOBS

**NOTE:** Calculations are based on multipliers estimated using a standard Leontief input-output model using data from the World Input-Output Database and internal employee and financial data. Jobs in the surrounding economy include indirect jobs created at suppliers and induced through household consumption. Calculations exclude jobs created through the construction of the Novo Nordisk manufacturing facility in Kaluga.

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A. Cost is expressed in US dollars and has been converted from 6.7 billion roubles at the rate of USD 1 = RUB 31.6, the standard rate for 2011.

B. Cost is expressed in US dollars and has been converted from 68 billion roubles at the rate of USD 1 = RUB 45.4, the standard rate for 2015.

C. The result of saved costs is for direct costs only (costs of complications and management) and excludes indirect costs (such as lost productivity due to premature death).
Value for Novo Nordisk

Diabetes care is Novo Nordisk’s largest and fastest-growing business area, accounting for 79% of the company’s total sales.¹⁹ We have achieved this by remaining focused and striving to always identify and develop better solutions for people living with diabetes.

Our continued presence in Russia and experience of working collaboratively has allowed us to develop proven solutions. Scaling up our efforts in partnership will allow us to reach more people with diabetes and address the rising diabetes epidemic.

A STRONG POSITION IN AN IMPORTANT MARKET

We currently supply insulin to more than 467,000 people in Russia.²⁰ Through our long-term presence and continued investment in Russia, we have maintained a favourable market position in a growing market (Figure 15).²¹ Our share of the modern insulin market is more than 50%.²¹

With 60% of people with type 2 diabetes still undiagnosed² and just 20% of people with type 2 diabetes on insulin treatment, Russia represents significant growth potential for Novo Nordisk. We have therefore been making investments for the future, ahead of the diabetes curve. Investing in a manufacturing facility allows us to consolidate our position, be closer to the people who need our products and contribute to the development of a strong local pharmaceutical industry.

EMPLOYEE ENGAGEMENT

Establishing a new manufacturing facility from scratch is a large commitment and requires both general skill development and training in very specialised expertise areas for our employees. We invest in educating our employees, helping them raise their skill levels through in-house as well as external training. Our specialised business and considerable investment in training our employees make it important to retain talent. In Russia, we have a low staff turnover rate, below the industry average²⁰, which suggests that our employees value our approach to doing business.

A. The number is estimated based on average dose as recommended by the World Health Organization.

FIGURE 15 THE INSULIN MARKET HAS GROWN WITH ALMOST 10% OVER THE PAST FIVE YEARS²¹

Russian insulin market volume, 2010 = index 100

**“Being part of this company and our production in the Kaluga region is important for me because of the company’s values – the focus on quality and compliance. This is not just a philosophy, this is how we work every day”**

Employee at Novo Nordisk Russia, 2014
In 2015, Novo Nordisk began production of modern insulin in Russia at the new high-tech insulin manufacturing facility in Grabtsevo Technopark in the Kaluga region. The facility is the first and only greenfield facility in Russia for the manufacturing of a complete portfolio of modern insulins. However, the facility is about more than production of insulin – it is about producing insulin to the highest standards, investing in people and contributing to Russia’s Strategy Pharma 2020.

First and only **greenfield** manufacturing facility for modern insulin in Russia

In 2012, we became a member of the Kaluga Pharmaceutical Cluster. The initiative is a non-commercial partnership that aims to consolidate the efforts to build a high-tech complex of manufacturing and infrastructure facilities in the Kaluga region. As part of this initiative, we are participating in the development of key regional programmes such as a centre for professional training for the pharmaceutical industry. Currently, there are more than 50 companies in the pharmaceutical cluster, including a number of global leaders in the pharmaceutical industry.

**Partnering for development and innovation**

**Ensuring high-quality medicines**

We use one global standard to ensure the quality of our products – no matter where in the world they are produced. Our quality management system has been designed to ensure that all manufacturing processes are in compliance with international standards such as Good Manufacturing Practices. All employees working in our production receive training to ensure compliance with the quality management system.

**Designing for energy efficient production**

We are committed to responsible production and limiting our environmental impact. One of the ways we do this is by constantly looking for greener and more efficient manufacturing processes and considering environmental efficiencies throughout the design process. At Novo Nordisk, we have environmental targets for emission of CO₂ and energy and water consumption. These targets also apply to the manufacturing facility in Kaluga.
Investing in people

The manufacturing facility employs around 150 people and to get the right candidates, specialists have been hired in from all over Russia. The advanced production facility has been designed to ensure a safe and comfortable working environment for all employees. English language courses are available for employees and training has been arranged for both local and non-local employees to bridge cultural differences. Through our global employee health programme, NovoHealth, we promote and support healthy living for all employees.

100 MILLION DOLLAR CAPITAL INVESTMENT

150 EMPLOYEES AT THE MANUFACTURING FACILITY IN THE KALUGA REGION

> 1,600 JOBS CREATED OUTSIDE NOVO NORDISK IN THE SURROUNDING ECONOMY IN RUSSIA THROUGH CONSTRUCTION OF THE FACILITY IN 2014

NOTE: Calculations are based on multipliers estimated using a standard Leontief input-output model using data from the World Input-Output Database and financial data. Jobs in the surrounding economy include indirect jobs created at suppliers and induced through household consumption. Calculations include only jobs created through the construction of the Novo Nordisk manufacturing facility in Kaluga.
Future perspectives

In Russia, we have been committed to people with diabetes since 1924. With the opening of an insulin manufacturing facility in Kaluga, we have stepped up our commitment, bringing us closer to the people who rely on our products and expertise. We will continue to actively seek collaboration to improve the lives of people with diabetes.

The diabetes challenge is complex and overcoming it in a sustainable way requires the collaborative effort of many stakeholders. Our activities in Russia have demonstrated that partnerships are effective for realising change, as each partner brings its unique strengths to the table.

To make an even greater impact for people with diabetes, we believe it is important to continue to collaborate and together improve diabetes awareness in the general population and improve blood sugar control among people with diagnosed diabetes. In so doing, we can improve both the quality of life for all people with diabetes and reduce the costs to society (Figure 16). Through collaboration with people, organisations and governments, we can unlock the potential to overcome the diabetes challenge.

At Novo Nordisk, our goal is simple – to defeat diabetes. Until then, we will continue to collaborate to support people with diabetes in living fuller and healthier lives.

### FIGURE 16 UNLOCKING THE POTENTIAL FOR CHANGING DIABETES IN PARTNERSHIP

**HOW TO GET THERE**

- Make high-quality and innovative medicines available to people with diabetes
- Ensure access to highly skilled healthcare professionals
- Make information and patient education accessible to people with diabetes
- Bring diagnostic services and diabetes information closer to people

**HOW WE CAN CONTRIBUTE**

- Investment in the research and development of innovative products for people with diabetes
- Local manufacturing of high-quality modern insulin
- Building diabetes care knowledge for both healthcare professionals and people with diabetes
Methodology

DRIVERS OF SHARED VALUE CREATION
Our goal is to identify best practices in diabetes management and actions that can have the greatest positive impact. We examine the inter-relatedness of drivers of shared value creation and identify those that could yield the greatest value for society and Novo Nordisk.

We use a model with five challenges for diabetes care (Figure 7) to guide our understanding of what creates the greatest value for people with diabetes while also generating significant value for Russian society and for our company. We consider activities that maximise benefits and minimise risks for all parties in both the short and long term.

ASSESSMENT OF IMPACT AND VALUE CREATION
The observations and conclusions of this case study build on our understanding of the shared value concept and our Triple Bottom Line business principle. Societal value creation includes broader general awareness, improved accessibility to diabetes care knowledge and skilled healthcare professionals, availability and affordability of quality treatment and care and increased quality of life for patients.

Measurable benefits for the company include employee satisfaction, low turnover rates and maintaining a leadership position in an important market.

DATA COLLECTION AND ANALYSIS
Data collection and analysis were conducted simultaneously, allowing our interpretation of the data and conclusions to develop side by side.

We also researched quantitative data and academic papers. To support development of this case study, we used internal data, some of which is confidential. We generalised confidential information and indexed figures to prevent disclosure of sensitive information.

Models used for calculating value
Health economic analyses using the IMS CORE Diabetes Model were conducted to estimate reductions in levels of complications and related healthcare costs. The IMS CORE Diabetes Model is a large-scale, peer-reviewed, computer simulation model based on updated published research on diabetes suitable for estimating changes in risk of comorbidity and mortality given changes in HbA1c, hypoglycaemic events and data on health status at the beginning of simulations.

Employment effects have been calculated as a consequence of Novo Nordisk operations in Russia. Indirect effects on employment are estimated using input-output models for Russia based on the data from the World Input-Output Database. The model enables the estimation of indirect and induced effects on employment from Novo Nordisk operations in Russia. Effects include consumption relating to salary, honorariums and other cash payments, and indirect effects relating to employment effects in Novo Nordisk’s supply chain in Russia.

A full methodology on health economic analyses and employment effects calculations can be requested by sending an email to sustainability@novonordisk.com.
References

The Blueprint for Change Programme

The Blueprint for Change Programme aspires to set new standards for measuring and optimising the societal impact of our business activities.

The Blueprint for Change Programme analyses the Triple Bottom Line business principle in practice, enhancing our understanding of how we as a business create value.

Through a series of case studies, we provide insight into current and emerging sustainable business approaches, as well as best practices for creating shared value.

This is the ninth Blueprint for Change case study. Other cases have analysed climate change and CO₂ reduction and the value created through clinical research. We have also analysed our approach to meeting diverse challenges to changing diabetes in collaboration with partners across the world in countries such as China, the United States, Bangladesh, Indonesia, India and Turkey.

We do not present final answers, but rather a work in progress that invites stakeholders to share their own views. We showcase how partnerships can co-innovate sustainable solutions to complex societal issues.

By definition, a blueprint is a guide or plan that gives instructions on how to take an idea and turn it into action. We want to inspire leaders to take action and to implement innovative and sustainable solutions to the highly complex issues they face.

Read more at novonordisk.com/blueprint.
About Novo Nordisk

Novo Nordisk is a global healthcare company with more than 90 years of innovation and leadership in diabetes care. The company also has leading positions within haemophilia care, growth hormone therapy and hormone replacement therapy. We believe that a healthy economy, environment and society are fundamental to long-term value creation. This is why we manage our business in accordance with the Triple Bottom Line business principle and consider the financial, environmental and social impact of our business decisions. The strategic commitment to corporate sustainability has brought the company onto centre stage as a leading player in today’s business environment, recognised for its integrated reporting, stakeholder engagement and consistently high sustainability performance.

For more information, visit novonordisk.com/sustainability