



The **Blueprint for
Change** Programme

Partnering to innovate diabetes care in Thailand

Improving diabetes care and access to treatment can improve the quality of life and overall health of society in Thailand.

CHINNAKRIT SEECHAROEN
with his sister and father
Thailand
Chinnakrit has type 1 diabetes



Diabetes is becoming a growing issue

There are currently five chronic, non-communicable diseases that represent an increasing burden on Thailand's healthcare system. These diseases are hypertension, heart disease, cerebrovascular disease, cancer, and in particular diabetes with its associated micro- and macrovascular complications such as nephropathy, cardiovascular diseases, retinopathy, neuropathy, and amputations. These diseases lead to significant social and economic losses, in terms of increasing death and disease rates and increasing burden on the healthcare budget.

Thailand is an ageing society. By 2025, the proportion of people over 60 years will exceed 20%. One out of five people aged over 60 years will have diabetes. The International Diabetes Federation projects that the number of Thai people with diabetes in 2040 will increase to 5.3 million. The Ministry of Public Health is prioritising to address the burden of diabetes via the National Strategic Plan 2017-2036. The Cabinet has, in principle, approved the National Strategic Plan and its implementation mechanism, which will be used as a framework to advance coordinated and united efforts on all levels, with the aim to campaign for disease prevention and healthy life style promotion for building better healthcare systems in the age of sustainable development.

H.E. Clin. Prof. Emeritus Piyasakol Sakolsatayadorn, M.D.
Minister of Public Health, Thailand

Committing to the 2030 Agenda

Diabetic Mellitus (DM) is one of the most severe non-communicable diseases in the world and the number of DM patients is increasing every year as a consequence of changing lifestyles and unhealthy dietary habits. Diabetes complications, in particular kidney failure, are responsible for huge dialysis costs, which constitute a heavy financial burden globally as well as here in Thailand.

In line with the 2030 Agenda for Sustainable Development, it is well known that Thailand has made a serious commitment to control non-communicable diseases (NCDs) and meet globally agreed targets aimed at reducing premature deaths from these conditions by one third by 2030, thereby benefitting millions of people.

The Royal Danish Embassy has historically supported several initiatives related to diabetes in Thailand. One example is the mobile eye clinics where we partnered with the Ministry of Public Health and the World Diabetes Foundation and also engaged with Novo Nordisk Pharma Thailand to serve people with diabetes-related complications in rural areas since 2009. We will continue to support public-private partnerships to address the burden of diabetes in Thailand

The Blueprint for Change study is a comprehensive tool to be utilized to assess the burden of diabetes and to prevent diabetes-related complications from developing. The study illustrates the need for cross-sector engagement in order to address these challenges.

Uffe Wolffhechel
Danish Ambassador to Thailand and Cambodia

Meeting the diabetes challenge

The National Health Security Office (NHSO) was established by the National Health Security Act 2002 as an autonomous agency. It is governed by the National Health Security Board chaired by the Minister of Public Health, to manage the Universal Coverage Scheme (UCS) for 72% of Thai citizens whose health is not covered by other public schemes.

Promoting accessibility to quality care, household's financial risk protection, and equity and efficiency of coverage are important aspects. The UCS benefit package is comprehensive and includes a holistic management program for diabetes mellitus and hypertension that covers the whole spectrum of care (prevention, curative care, rehabilitation) and encourages collaboration and participation from involved organizations and networks including the Ministry of Public Health, professional associations, academic, and local governments.

Diabetes mellitus (DM) and hypertension (HT) are chronic metabolic diseases (or noncommunicable diseases, NCDs) and are important public health problems. It is important to be managed and disease management program under the UCS scheme includes health promotion, disease screening, treatment, and prevention of losses from complications. The National Health Security Board has allocated Chronic Disease Management Fund (Diabetes and hypertension) since 2010. Policy direction has been guided by the Development and direction Committee on prevention control and treatment of DM and HT for Thailand. Universal Health Coverage (UHC) was appointed in November 2009. Members of committee include representatives from the Ministry of Public Health (MOPH), medical universities, related professional associations, and administrative organizations of public health schemes such as the NHSO, Social Security office (SSO), Comptroller General's Department (CGD) and Local Administration Association.

Pro-active, population-based management is an important approach for early detection in order to prevent or reduce complications, e.g., cardio-vascular diseases, chronic renal failure, and to promote continuous care from primary care to tertiary care. Furthermore, collaboration and participation among related organizations and networks including the Ministry of Public health, related professional associations, and universities in term of budgeting, knowledge management, and health information management for policy decision to promote accessibility and quality of care is also a key tool for holistic care in NCDs.

We look forward to your continued support and engagement for the better life of the Thai population.

Sakchai Kanjanawatana, M.D.
Secretary-General
National Health Security Office, Thailand

Holistic approach to diabetes care

Diabetes is one of the non-communicable diseases (NCDs) that the United Nations has declared as a global burden on human health and on which it has called for attention and action from all member states. Thailand also recognises the need for different industries and stakeholders to join forces in defeating diabetes. The Diabetes Association of Thailand takes full responsibility to strive for excellence in diabetes management. Our mission is to provide and support knowledge generation and innovation for treatments for diabetes through collaborations on all levels. We are coordinating with the National Health Security Office (NHSO) to establish and improve a care pathway for type 1 diabetes patients and set up effective diabetes care teams. For patient networking, we have set up the Diabetes Club Alliance to exchange the success of self-management techniques between different patient groups and replicate learnings to new patient groups. With all of this, we believe that we could continue our collaborative efforts to raise the standard of care and achieve better outcomes in diabetes management.

We hope that this booklet demonstrates and reflects the impact of diabetes and its complications in Thailand. Additionally, we hope it will become a catalyst for initiating partnerships among multidisciplinary stakeholders or a platform to address the burden of diabetes and its complications on Thai healthcare system and society.

Prof. Emeritus Wannee Nitiyanant, M.D.
President, Diabetes Association of Thailand
Under the Patronage of Her Royal Highness Princess Maha Chakri Sirindhorn

We need to unite to change diabetes

Diabetes is one of the critical and complex diseases globally that need special attention on multidisciplinary approach. Health promotion by lifestyle intervention plays the key role to reduce a rise of diabetes incidence. In Thailand, for those 4.8 million people who already have diabetes, a monitoring framework should be provided to increase standard of diabetes treatment. Setting the goal of treatment is an initial step to get alignment and commitment between physician and patient to achieve target of glucose level. During treatment, patients should have an optimal treatment, may include available innovative medicine and new drugs come along. Moreover, patients should have regular checkup for their diabetic complications. These are vital factors to improve treatment outcomes and reduce complications that burden on patients themselves and overall healthcare system. Therefore, team work and collaboration among healthcare providers are especially essential for patient care.

This publication illustrates the up to date of the burden of diabetes in Thai society. It may ignite and inspire all stakeholders to cooperate and improve diabetes management even better for all Thai diabetes patients.

Prof. Chaicharn Deerochanawong, M.D.
Scientific Chairman of the Endocrine Society of Thailand
Scientific Chairman of Thai Diabetes Association

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INFOBOX 1

What is diabetes?

Diabetes is a chronic condition that requires constant management and affects the daily lives of people with the condition and their families. Diabetes occurs when the body either cannot produce enough insulin or cannot use it effectively. Insulin is a hormone that helps sugar enter cells so that the body can use it for energy.¹ Without the help of insulin, sugar builds up in the bloodstream. **Most of the long-term health complications associated with diabetes are the result of persistently high blood sugar levels.¹**

INFOBOX 2

What is HbA_{1c}?

The target of diabetes treatment is to keep blood sugar levels at a normal or near-normal level. One key parameter is HbA_{1c}, which is a measure of blood sugar within a three-month period.¹ An HbA_{1c} level of $\leq 7\%$ is considered a marker of good control.² People with an HbA_{1c} level of $\geq 5.7\%$ are considered to be at risk for having diabetes.² In Thailand, the average HbA_{1c} level is 8.1% for people with diabetes.³ A level higher than 7% is associated with an increased risk of diabetes-related complications.^{1,4}

4.8 million Thai people live with diabetes, and many will develop complications at some point in life

Increasingly sedentary lifestyles, obesity and ageing bring about non-communicable diseases such as diabetes. The prevalence of diabetes is expected to grow, reaching 5.3 million people by 2040. When diabetes is poorly managed, it may lead to debilitating complications such as kidney disease and amputations.

Until recently, communicable diseases have been the primary cause of mortality and morbidity across the globe. However, the balance is shifting towards non-communicable diseases (NCDs).^{5, A}

In Thailand, NCDs including diabetes account for more than 70% of all deaths.⁵ In 2016, about 76,000 deaths in Thailand were related to diabetes, which equates to more than 200 deaths every day.¹



> 200 people die every day as a consequence of diabetes in Thailand¹

Data from the Thai National Health Examination Surveys (NHES V) indicate that the prevalence of diabetes in Thailand in individuals aged 15 and over has increased from 6.9% in 2009 to 8.9% in 2014.³

The trend is predicted to continue if no actions are taken. A good indication of the challenge ahead is the 7.5 million Thai adults living with prediabetes today.^{3, 7, B} Among people with prediabetes, 70% are likely to develop diabetes later in life.⁷

Sedentary lifestyle and obesity affect the onset of diabetes

The increasing prevalence of diabetes in Thailand is likely to be related to the increase in the prevalence of obesity and the number of people leading sedentary lifestyles.³ Other key diabetes risk factors indicated in the national Thai diabetes guideline include ageing, gender and family history.⁸



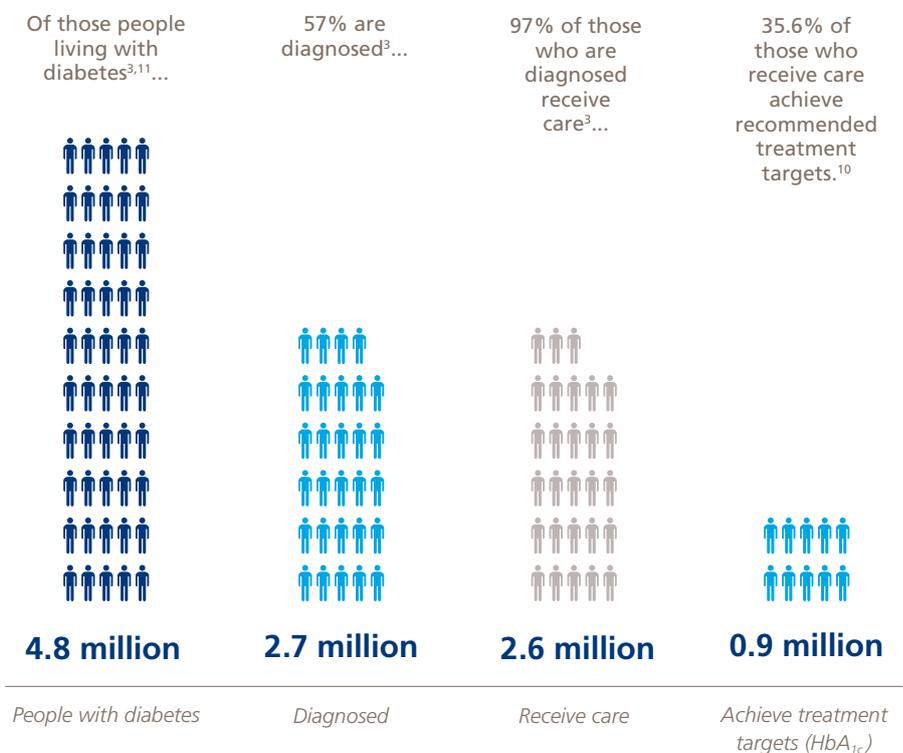
Obesity leads to a more than **a seven times increase** in the risk of developing type 2 diabetes, while being overweight increases the risk by three times.⁹

The 'Rule of Halves' maps out the diabetes situation

In Thailand, it is estimated that only 57% of people living with diabetes are diagnosed.³ Most people who are diagnosed receive care, of whom 35.6% achieve recommended treatment targets.¹⁰

FIGURE 1 — THE DIABETES 'RULE OF HALVES' IN THAILAND

Of those who are diagnosed and receive care, 35.6% achieve treatment targets^{3,10,11}



^A NCDs are chronic conditions such as cardiovascular disease, cancer and diabetes. What these conditions have in common is that the person are expected to live with them for the rest of their lives as no current cure exists.

^B Prediabetes (intermediate hyperglycaemia) is a high-risk state for diabetes that is defined by blood sugar level that is higher than normal, but lower than diabetes thresholds.

Poorly controlled diabetes may lead to complications

The goal of diabetes treatment is to ensure that the blood sugar level is kept at normal or near-normal levels. Measuring HbA_{1c} level is one way to assess a person's average blood sugar level over time. Poor blood sugar control or an HbA_{1c} level higher than 7% is associated with an increased risk of complications.¹³

When diabetes is poorly managed and undertreated, it may have significant negative consequences for people with diabetes as it may lead to disabilities and complications such as eye disease, stroke, kidney disease, cardiovascular disease and amputation (Figure 2).

Data from the 2006 Thailand Diabetes Project indicate that of those people with diabetes who receive care, 44% suffer from kidney disease, 31% suffer from eye diseases and 8% suffer from heart disease.¹⁴ A different study suggests that almost 30% of people with diabetes, who receive care, live with chronic kidney disease, while 7.2% and 6.4% live with eye and heart disease respectively.¹⁰

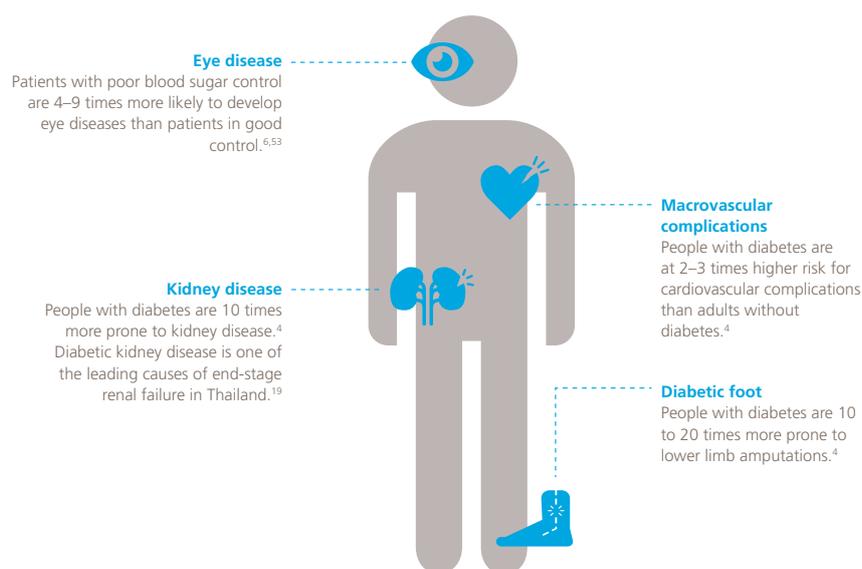
Screening rates for complications have improved

The rate of screening for complications in Thailand has improved significantly over the years (Figure 3). In particular, there was a rapid improvement in lipid profile (cholesterol) screening from 43% in 2010 to 66% in 2014.¹⁵

However, there is little evidence to indicate that screening results are used by physicians to guide treatment decisions.¹⁵

FIGURE 2 — DIABETES-RELATED COMPLICATIONS

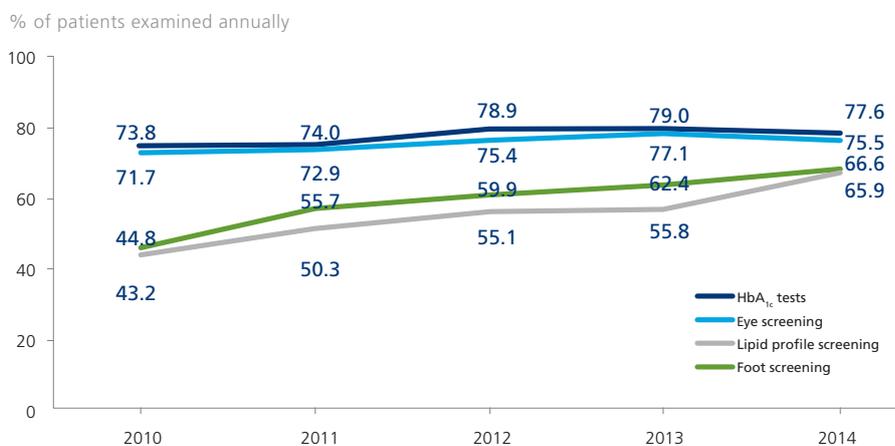
Uncontrolled diabetes is associated with an increased risk of complications



Note — Potential complications from diabetes.

FIGURE 3 — SCREENING RATES

Screening for complications has become more accessible¹⁵



Note — The ADA recommends HbA_{1c} screenings four times a year.³¹ Lipid profile (cholesterol) screening helps determine an individual's risk of heart disease.

Well-managed diabetes may help slow the progression of chronic kidney disease

Diabetes is one of the main risk factors for developing chronic kidney disease. Controlling the onset of diabetes may help prevent the progression of kidney disease, thereby avoiding significant costs associated with late-stage kidney disease.

The prevalence of chronic kidney disease is high

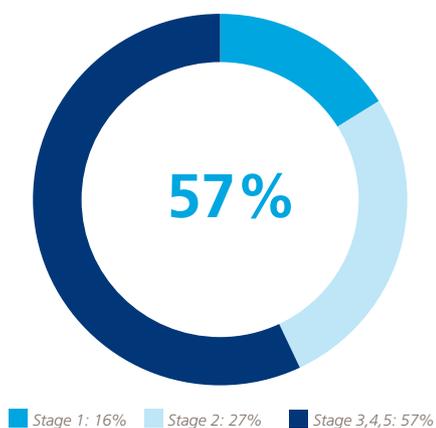
2-9 million Thai people suffer from kidney disease.¹⁹ The majority are in stage 2 and 3.¹⁷ The prevalence of chronic kidney disease in people with diabetes who receive care is almost 30%.¹⁰ Among people living with diabetes in Thailand who receive care, 800,000 are estimated to live with diabetes-related kidney disease (Figure 5). This means that focusing on kidney disease as a component of diabetes management is hugely important.

Awareness of chronic kidney disease is low

Only 1.9% of Thailand's general population were aware that they had kidney disease.¹⁸ General practitioners routinely use serum creatinine to assess kidney function because it is widely available in general hospitals across the country. However, this method could underestimate the diagnosis of chronic kidney disease, particularly in women and the elderly.¹⁸ The main risk factors for developing kidney disease include advanced age, diabetes, hypertension, historical use of traditional medicines and kidney stones.¹⁸

FIGURE 4 — KIDNEY DISEASE

57% of Thai diabetes patients with kidney disease have reached an advanced stage of kidney disease¹⁷

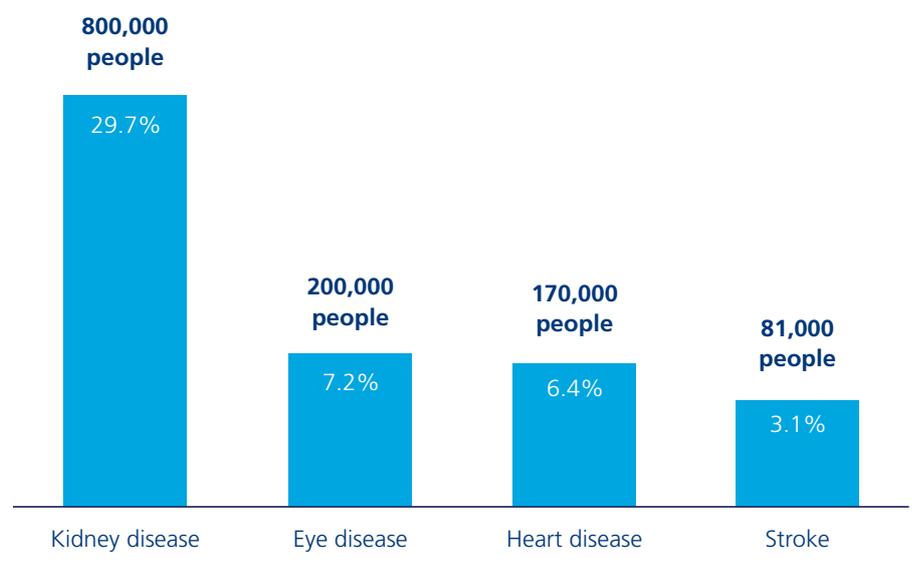


Note — People with diabetes are especially prone to developing end-stage kidney disease, and many will need RRT.¹⁹

FIGURE 5 — PREVALENCE OF DIABETES-RELATED COMPLICATIONS

Almost 30% of people treated for diabetes in Thailand have kidney disease^{3,10,11}

Prevalence among people with diabetes who receive care



Kidney disease may lead to dialysis

Research shows that poorly controlled diabetes accelerates kidney disease at every stage, contributing to increasing healthcare costs, including expensive procedures such as regular dialysis.^{20, A} The Bureau of Non-Communicable Diseases has set up chronic kidney disease clinics with the aim of slowing the progression of kidney disease.¹⁹

However, public health provision in Thailand is not always able to provide dialysis support or transplantation. In many parts of the country, renal replacement therapy (RRT) is limited, possibly due to resource constraints.¹⁹

The cost of kidney disease is high

The cost of kidney disease is mainly driven by dialysis costs.¹⁹ In 2014, the mean dialysis cost per session averaged

2,161 baht (63 US dollars^B) across healthcare providers.²¹ It not only results in greater healthcare expenditures, but also increases the burden in terms of working hours of healthcare professionals.



414,485 baht
or 12,200 dollars per year is the estimated cost of treating end-stage kidney disease²⁵

Therefore, the prevention of chronic kidney disease progression is vital for both public health and health spending in Thailand.

^A Dialysis is the clinical purification of blood, as a substitute for normal kidney function.

^B Novo Nordisk standard exchange rates April 2017 applied. The mean dialysis cost per session in Thailand was about 1,879 baht in 2014. The cost is equivalent to 2,161 baht in current prices after adjusting for inflation with the Thailand consumer price index (CPI) and presented in 2017.

Diabetes complications are costly to the government and to Thai society

Diabetes and its complications impose a large burden on the national healthcare budget. A major component of this cost arises from dealing with potentially avoidable long-term complications of the disease. Only a fraction is spent directly on diabetes medicines.

The World Health Organization (WHO) estimates that 11% of the total health expenditure in Thailand is allocated to diabetes care, which is comparable to other countries in the region. By 2030, this figure is expected to grow by 41%, effectively doubling the societal burden of diabetes.²²

There is little information on the total actual cost of diabetes in Thailand. However, according to a local study involving 475 patients receiving treatment in a hospital in the north-east of Thailand, the average cost of diabetes per patient in Thailand is about 32,438 baht (948 dollars^{A, B}).^{23,24}

Complications significantly increase the cost of diabetes

49% of the direct medical cost of diabetes is allocated to hospital care or the cost of complications, while the cost of medicine accounts for only 14% (Figure 6).²³

Once a patient develops complications related to diabetes, the cost of treating those complications is associated with that disease rather than with diabetes.

Compared to a person with diabetes living without complications, someone who has two complications requires 6.6 times more resources, while a person with three or more complications requires 18.5 times more resources to take care of their condition (Figure 7).²³

Hypoglycaemia as a common cause of hospitalisation

Hypoglycaemia (low blood sugar level) is one of the barriers to achieving blood sugar control. Hypoglycaemia often leads to a pounding heart, trembling and, in severe cases, seizures, coma and even death. Unfortunately, cases of hypoglycaemia are often underreported, and this might mask the scale of the problem.²⁶

Severe hypoglycaemia is a common cause of hospitalisation, which increases the economic costs of diabetes.²⁶ The cost of treating a severe hypoglycaemic event is 28,560 baht (835 dollars^A).²⁵

FIGURE 6 — DIRECT MEDICAL COST

49% of direct diabetes medical cost is spent on hospital care²³

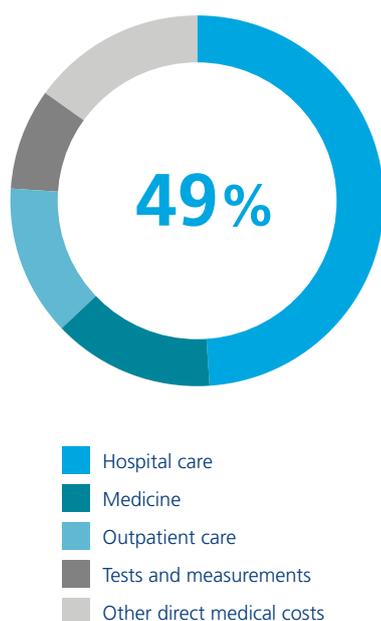
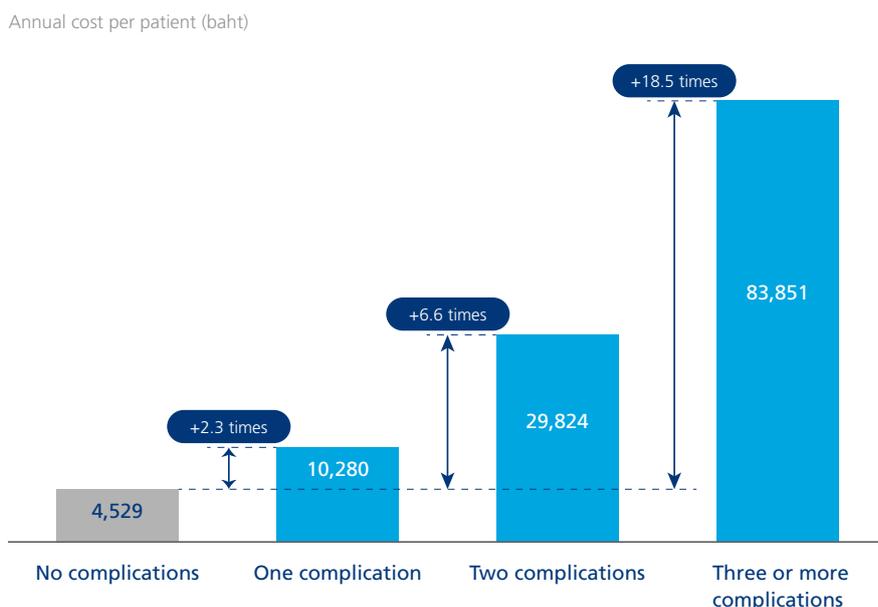


FIGURE 7 — ANNUAL MEDIAN COST PER PERSON WITH DIABETES

18.5 times higher cost for a person with diabetes with three or more complications compared to a person without complications²³



Note — Exchange rates applied as reported in the publication.²³

^A Novo Nordisk standard exchange rates April 2017 applied.

^B The average cost of diabetes per patient in Thailand was about 28,200 baht in 2008. The cost is equivalent to 32,438 baht in current prices after adjusting for inflation with the Thailand consumer price index (CPI) and presented in 2017.

Strengthening access to quality diabetes care could improve health outcomes in Thailand

High-quality care and availability of skilled healthcare professionals are prerequisites for good health outcomes. However, a shortage of healthcare professionals and healthcare inequalities prevent many from living a healthy life with diabetes.

For people with diabetes, access to good healthcare and spending quality time with the physician are vital for leading a healthy life with diabetes.

There are too few diabetes specialists

In Thailand, there are 4.8 million people with diabetes and only 272 endocrinologists (or specialists) available. This results in patient overload and insufficient consultation time.

The impact of limited time with the patient may lead to inadequate achievement of treatment goals, leading to diabetes-related complications.^{14,15}

The use of a multidisciplinary team approach to diabetes care – involving specialists, nurses, pharmacists, dieticians and health educators, among others, with the patient at the centre of the team – has been demonstrated to improve both blood sugar control and patient quality of life.²⁸



20,000 people living with diabetes for every endocrinologist working in Thailand^{3,11,27}

Access to care is not equal

Quality of diabetes care in Thailand should be adequate since the introduction of the universal healthcare coverage scheme in 2002. Today, the scheme provides access to universal healthcare coverage for 77% of the population, with 17.5% of the population being covered by the Civil Servant Medical Benefit Scheme (CSMBS) and 4.1% by the Social Security Scheme (SSS) for people employed in the private sector.¹⁰

Although coverage is universal, there are variations in access to specialised

care and innovative diabetes medicines between the schemes.

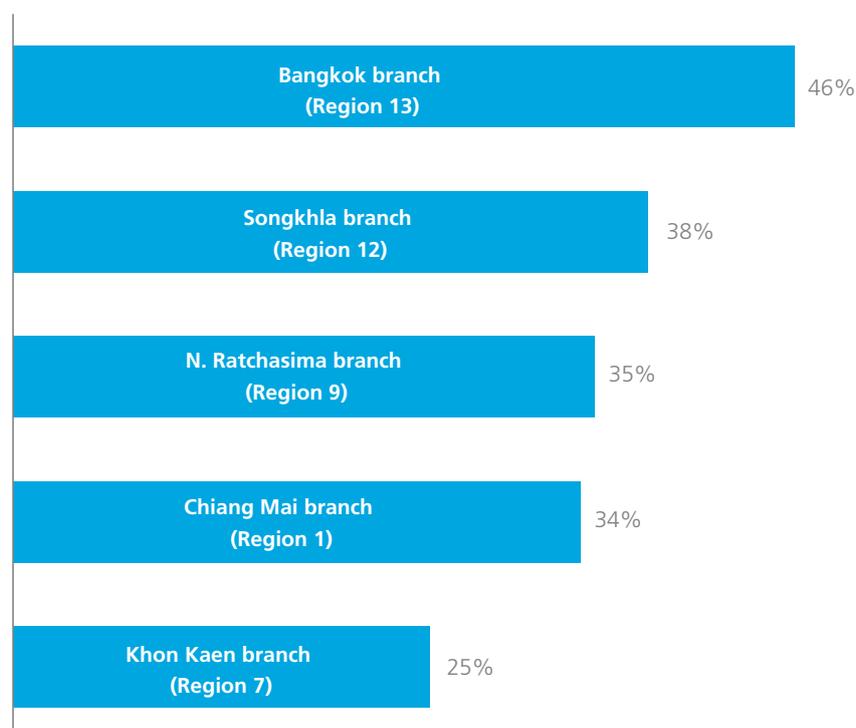
Factors that have been shown to influence health outcomes for people with diabetes in Thailand are duration of diabetes, type of hospital and region of residence.¹⁰

People cared for in provincial hospitals achieve better results than those treated in community hospitals. Furthermore, significant differences are observed in different regions across the country (Figure 8).¹⁰

FIGURE 8 — REGIONAL VARIATION IN HEALTH OUTCOMES

A patient living in the Bangkok region is twice as likely to achieve desired treatment targets than a resident of the Khon Kaen region¹⁰

% of patients reaching the recommended HbA_{1c} target of 7%



Proactive diabetes management may enhance quality of care for people with diabetes

Proactive diabetes care involves referring patients to specialists early, initiating timely insulin treatment and performing regular screenings for complications. Attention to this process may improve quality of care – and quality of life – for patients.

The Thai diabetes guidelines as well as those from international diabetes organisations, including the American Diabetes Association (ADA), the European Diabetes Policy Group and the Canadian Diabetes Association (CDA), recommend targets of HbA_{1c} < 6.0%-7.0% in people with type 2 diabetes.^{8,31-33}

These guidelines emphasise the positive impact that improved blood sugar control has on complications, as demonstrated by data from the United Kingdom Prospective Diabetes Study (UKPDS) (Figure 9).^{13,29}

However, despite increasingly stringent guidelines, several large-scale studies have shown that many people with diabetes struggle to achieve and maintain treatment targets.²⁸

In Thailand, three out of five people with diabetes who receive care do not achieve the recommended treatment targets.³

In part, this is because diabetes is a progressive disease (Figure 10) and the current treatment approach involves

a stepwise approach to blood sugar control.²⁸

In the stepwise approach, patients begin with lifestyle modification, followed by treatment with a single oral antidiabetic agent, which is often intensified through higher doses. Insulin is added later in the treatment regimen after the failure of oral agents (Figure 10).²⁸ In reality, insulin initiation might be delayed until complications have developed.³⁰

In Thailand, the average patient has lived with diabetes for 10 years and the insulinisation rate is only 22%.^{10,14}

FIGURE 9 — UKPDS STUDY RESULTS

Better blood sugar control is associated with risk reductions for complications¹³

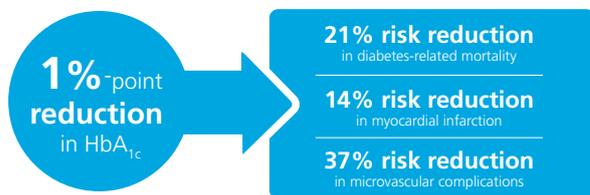
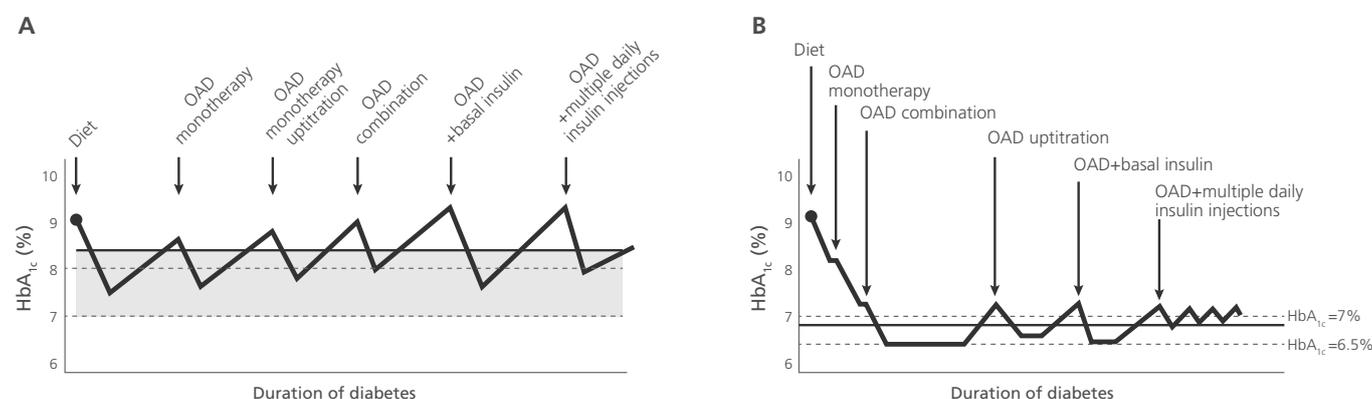


FIGURE 10 — DIABETES MANAGEMENT

Early and effective treatment with combination therapies²⁸



Note — Conservative vs. proactive management: (A) traditional stepwise approach and (B) early combination approach. OAD, oral antidiabetic drug. Adapted with permission from Campbell IW.²⁸

The Ministry of Public Health is committed to supporting people with diabetes

Health authorities in the country recognise the increasing burden of NCDs, such as diabetes, on the ability of the country to develop sustainably. Aspirations, strategies and actions are in place to help more people lead a longer, healthier and more productive life with or without chronic conditions.

Health is an important precondition for sustainable development. The World Health Organization (WHO) has launched a global monitoring framework on NCDs to track the burden of NCDs and has set nine voluntary global targets. One of the targets is to reduce the rise of diabetes.⁵⁴

NCDs are also at the top of the health agenda in Thailand. In 2011, the Thailand Healthy Lifestyle Strategy was launched to address NCDs, including diabetes. The plan aims to increase healthy life expectancy, decrease premature mortality related to NCDs and curb healthcare costs related to these chronic conditions in the next 10 years. The strategy also recognises the need for different partners to join forces in defeating NCDs.³⁴

A few examples of governmental initiatives to defeat diabetes

1. As a part of a project headed up by the Ministry of Public Health, two mobile eye care clinics toured the country in 2009-

2011³⁶ with the aim of screening and preventing costly complications.

2. The National Health and Security Office (NHSO) has set aside a significant budget to provide laser treatment for 7,589 people who have been affected by eye disease – a common complication arising from diabetes.³⁷

3. Chronic kidney disease continues to be a huge and costly challenge in Thailand.³⁸ In 2008, NHSO introduced renal replacement therapy (RRT) as the first therapeutic option for patients with end-stage kidney disease under the universal health coverage.³⁹ Up until 2015, more than 30,000 cases of RRT were performed, and 85% of eligible people gained access to this procedure.⁴⁰

4. NHSO incentivises diabetes clinics by applying pay-for-performance schemes, providing more funding to clinics that

are successful in screening and treating people living with diabetes.⁴¹

Collaboration is key to addressing health issues

In the spirit of collaboration and with the focus on the sustainable development of the nation, the Royal Thai government welcomes the Sustainable Development Goals³⁵ (Figure 11) and, in partnership with other organisations, supports many activities that aim to address various societal challenges.

Thailand has defined its own approach to sustainable development and aims to achieve its sustainable development goals through the Sufficiency Economy Philosophy (SEP), a decision-making framework that aims to balance the use of economic, social, environmental and cultural dimensions of life.⁴²

FIGURE 11 — SUSTAINABLE DEVELOPMENT GOALS

Sustainable Development Goals (SDGs)



In September 2015, world leaders adopted the 2030 Agenda for Sustainable Development.

The 2030 Agenda comprises 17 universal SDGs, or Global Goals, and 169 specific targets, which will guide policy and funding for the next 15 years.⁴³

The universal goals are a call to action to end poverty, protect the planet and ensure that all people enjoy peace and prosperity.⁴³

Changing diabetes requires a shared vision and united effort for the benefit of patients

By identifying and addressing the most acute patient needs and by working jointly with health authorities and other partners, sustainable value can be created for the benefit of patients, their families, society in general and all partners involved in these efforts.

Our approach to addressing patient needs

Our approach to good diabetes care is rooted in the Universal Declaration of Human Rights, which defines the right to health as essential for an adequate standard of living. Four key elements shape the right to health: availability, accessibility (affordability), acceptability and quality for patients.⁴⁴ The World Health Organization identifies awareness⁴⁵ as an additional critical element (Figure 12).

Together, these elements form a framework that guides our research into how diabetes care can be strengthened locally to benefit patients.

In this Blueprint for Change case study, we show how Novo Nordisk – in collaboration with local partners – is working within these areas.

Opportunities for all partners involved in diabetes care

Diabetes is a complex condition, and no single player can address diabetes challenges alone. We believe that when private and public partners work together, much more value can be created for the benefit of the patients and all partners involved. This is what we call Creating Shared Value (Figure 12).

Through this vision and our strong track record of successful collaborations and partnerships, we are striving to establish ourselves as partners in helping more people in Thailand live healthier lives with diabetes.

Sustainable business is good for patients and Novo Nordisk

Our core strategy is focused on our commitment to put the patient at the centre of everything we do, our work to

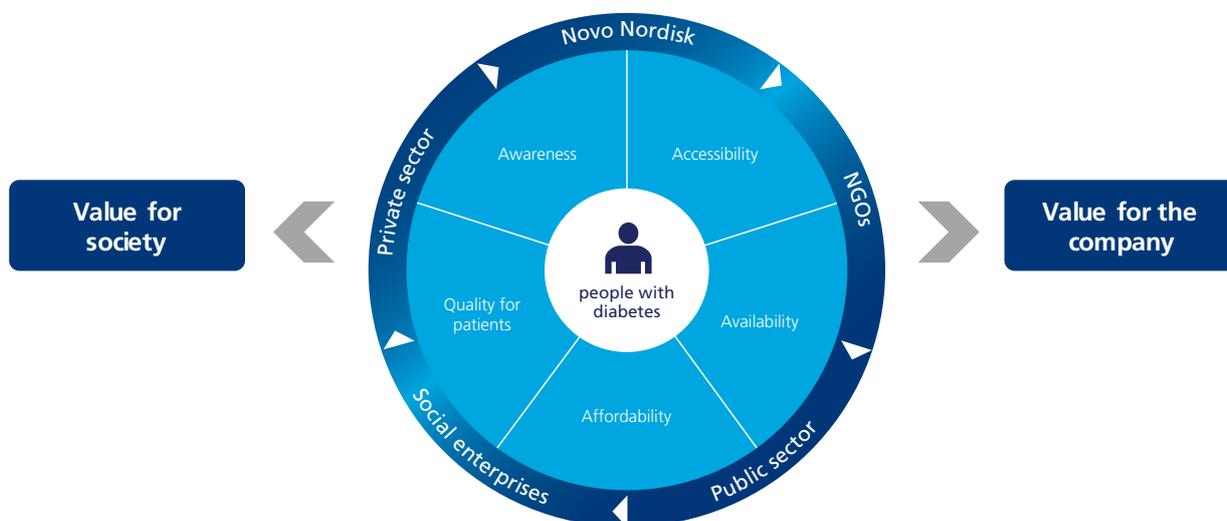
engage healthcare systems in a dialogue, our ability to make quality medicine available to patients and going beyond medicine to support people with diabetes.

We believe that what is good for patients, our employees and communities is also good for us. We also believe that our patient-centric way of doing business and focus on stakeholder relations have enabled us to maintain our leadership position in Thailand over several years. We supply nearly half of all insulin in the world and, in Thailand, three out of five people using insulin use our products.²⁵

We have also managed to build an engaging workplace and, since 2008, Novo Nordisk Thailand has doubled in size to more than 110 colleagues. Our people believe in our mission and are committed to defeating diabetes.²⁵

FIGURE 12 — CREATING SHARED VALUE THROUGH PARTNERSHIPS

Our value proposition rests on five elements of diabetes care



Novo Nordisk's commitment to Thailand dates back more than 30 years

Novo Nordisk has a 30-year history in Thailand. We bring innovative diabetes medicines to meet patients' needs regardless of their healthcare schemes. We are committed to people living with diabetes in Thailand and go beyond medicine to help more people live healthy lives with diabetes.

Novo Nordisk is a global healthcare company with more than 90 years of innovation and leadership in diabetes care. Headquartered in Denmark, we employ more than 42,440 employees in 77 countries and market our products in around 170 countries.²⁵

Our office in Thailand was formally established in 1983 (Figure 13), and we have grown significantly since then.

We are the market leader in diabetes care

Diabetes care is our largest and fastest growing business area, accounting for almost 90% of the company's sales in Thailand.²⁵ Since the very beginning, we have remained focused on developing innovative solutions to cater for people living with diabetes.

In Thailand, we offer best-in-class diabetes treatments and the most diverse product portfolio that ranges from basic human insulin in vials to modern insulin analogues in modern injection devices

or pens. This ensures that, regardless of the healthcare scheme and coverage, our medicine is available to all people with diabetes in the country.

In diabetes, there is no such thing as a 'one-size-fits-all' treatment. What suits one person's needs may not be the right treatment for someone else, and what works well for a person today may become ineffective over time. A range of treatment options is therefore needed to ensure the best possible blood sugar control and quality of life for each individual with diabetes.



3 out of 5
people using insulin in Thailand rely on Novo Nordisk products²⁵



A full portfolio
of innovative diabetes medicines is made available in Thailand to people with diabetes²⁵

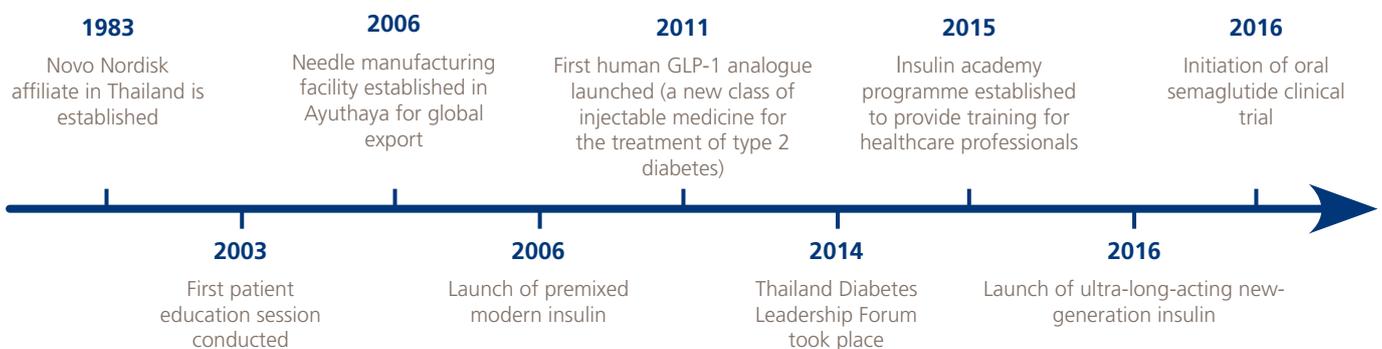
We drive our business in a sustainable way

At Novo Nordisk, we are guided by the Novo Nordisk Way. It describes who we are, where we want to go and the values that characterise our company.⁴⁶

In accordance with the Novo Nordisk Way, we strive to conduct our activities in a financially, environmentally and socially responsible way. This is what we call our Triple Bottom Line principle.

FIGURE 13 — NOVO NORDISK'S HISTORY IN THAILAND

A long history of commitment



We continuously drive innovation and promote better access to medicines

We invest in clinical research that may lead to better treatment options for people with diabetes. The value created in clinical research goes beyond data generation.

We increasingly invest in clinical research in Thailand

Clinical research is conducted to document the efficacy, safety and optimal use of human medicine.

The Pharmaceutical Research and Manufacturers Association (PReMA) reports that diabetes is the most researched therapy area in Thailand⁴⁷ and that Novo Nordisk accounts for the majority of the research in this area.²⁵

Since 2009, we have conducted 16 out of 25 diabetes trials and enrolled 472 patients in our research. We work closely with 16 hospitals around the country.²⁵

Clinical research is a collaboration between patients, the industry, healthcare professionals, the government and health authorities. When these stakeholders come together with a common goal for the benefit of patients, value is created

for all partners involved and goes beyond data generation on the efficacy and safety of medicine (Figure 14).⁴⁸



277 million
baht or 8 million
dollars have been invested by
Novo Nordisk in clinical research
in Thailand since 2009²⁵

We make our innovation accessible to patients

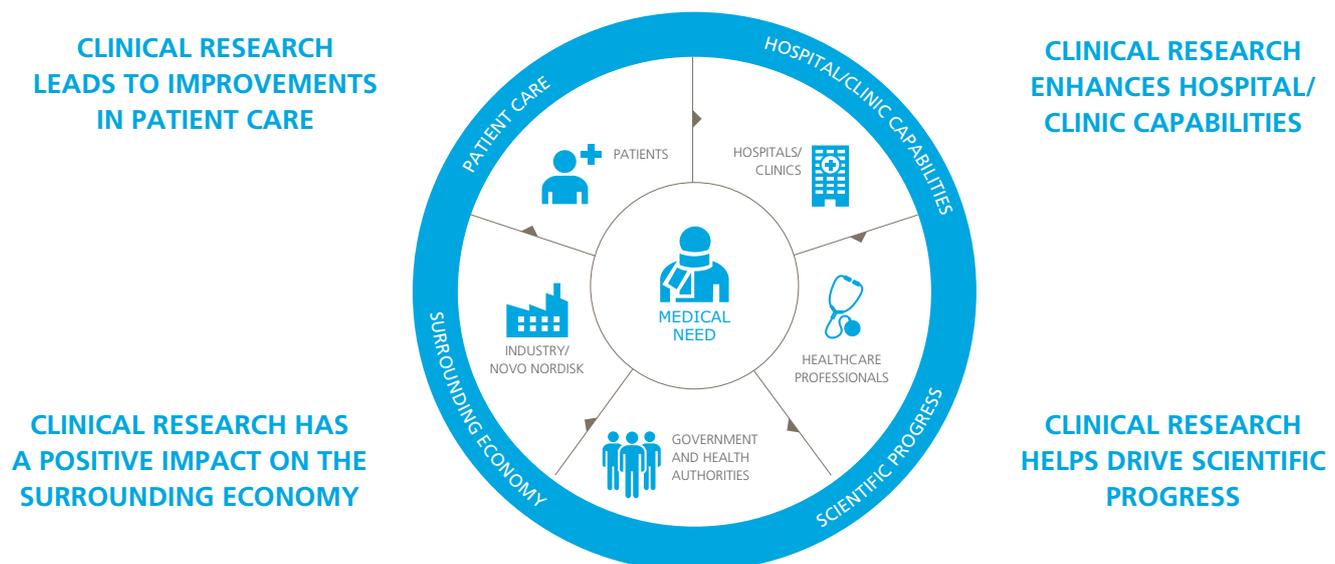
Our medicines are reimbursed by most healthcare systems around the world, and many of our innovations have become the standard of care. In Thailand, for example, selected insulin analogues have been listed

on the National List of Essential Medicines (NLEM)⁴⁹ and are accessible to patients on the universal coverage scheme, the Civil Servant Medical Benefit Scheme (CSMBS) and the Social Security Scheme (SSS).

In our efforts to support local healthcare providers, we go beyond making our medicines available to patients. We have also taken the following actions:

1. We distribute at least 40,000 insulin injection pens free of charge every year.²⁵
2. We provide free glucagon to treat severe hypoglycaemia and, since 2000, we have donated 700 vials of glucagon to our patients.²⁵
3. We provide free glucometers, blood measuring devices, to patients who are about to be initiated on insulin. We distribute about 2,000 glucometers annually.²⁵

FIGURE 14 — SHARED VALUE CREATION IN CLINICAL RESEARCH



Raising awareness and knowledge about diabetes may help people live healthier lives

Novo Nordisk is raising public awareness about diabetes to ensure early diagnosis and proper care for people with or at risk of developing diabetes. We also invest in patient education to enable more people to take good care of themselves and lead healthier lives with diabetes.

World Diabetes Day aims to increase diabetes awareness

On World Diabetes Day (WDD), which is celebrated annually on 14 November, we offer free blood sugar screening activities, advice on healthy cooking, physical activities and information about risk factors for type 2 diabetes to the general public (Infobox 3).

We have also hosted press conferences in partnership with the Diabetes Association of Thailand. At these conferences, stakeholders come together to discuss awareness, prevention, diagnosis, treatment and strategies for meeting the challenges of diabetes at national level.

Patient education enhances self-management skills

We realise that most diabetes care is performed by the person with diabetes,⁵⁰ which can often be challenging and interfere with that person's life. Therefore, to help more people perform proper self-management, we have partnered with universities, hospitals and medical associations to set up patient education camps (Infobox 4). This project was initiated in 1990, and focuses on providing high-quality education to people living with diabetes.

These camps are spread throughout the country in rural and urban areas. In 2016 alone, we reached 1,890 patients.

Patient education is performed by certified diabetes nurses who educate patients, families and caregivers on various topics about living with diabetes, such as diet, foot care, exercise, psychosocial aspects of diabetes, blood sugar measurements and ways to avoid complications.

Topics such as diabetes in pregnancy and in children are also frequently discussed during the sessions.

INFOBOX 3 — NOVO NORDISK INVESTS IN...

World Diabetes Day

WDD is celebrated annually on 14 November, and it aims to [increase public awareness](#), [encourage health improvement](#) and promote the exchange of high-quality information about diabetes.



More than 20 years

Novo Nordisk has celebrated World Diabetes Day in Thailand



~8.8 million

people have participated in Novo Nordisk WDD events around the world since 2010



World Diabetes Day event in Thailand, 2016

INFOBOX 4 — NOVO NORDISK INVESTS IN...

Patient education

Since 1990, patient education sessions have been taking place in Thailand. We supported the medical society and public hospitals in conducting these sessions as summer camps where [people with diabetes learn how to live healthy lives](#) with diabetes and strengthen their self-management skills.



~40 camps

conducted since 1990 throughout the country



~1,890 patients

participated at the patient education camps supported by Novo Nordisk in 2016



Patient education camp in Thailand, 2016

Improving knowledge and generating evidence about diabetes enhances quality of care

Novo Nordisk supports programmes that enhance the knowledge of healthcare professionals in order to improve the quality of diabetes care. We also support studies that aim to generate country-specific information about diabetes and its complications.

Healthcare professional training enhances quality of diabetes care

With partners, we support and host educational sessions, symposia and residential training sessions for healthcare professionals (Infoboxes 5 and 6). Moreover, we aim to expand the number of local scientific experts by conducting 'Train the Trainer' programmes. Topics for discussion during these training sessions include basic diabetes management, complications and current diabetes management therapies, diabetic foot care and managing acute complications such as hypoglycaemia.

Novo Nordisk believes in scientific education, both for patients and local healthcare providers, with the goal of helping to improve patient care and quality of life in all regions of Thailand.

Our healthcare professional education involves a variety of healthcare specialisms. For example, since 2003, as the first diabetes care company in Thailand, we have initiated an education programme for nurses.

Epidemiological studies generate evidence

We sponsor studies such as DiabCare Asia,^{50,51} a cross-sectional

epidemiological survey that evaluates the current status of diabetes management, complications and control. DiabCare Asia was initiated in Thailand in 1996 and followed up in 1998, 2001, 2003 and 2007.^{50,51} In collaboration with the Endocrine Society of Thailand, the Children and Adolescents Association and 20 hospitals, patient data were collected to analyse the existing status of diabetes management. The data generated from these surveys are unique and provide a huge opportunity to help improve diabetes care in Thailand in the immediate future.

INFOBOX 5 — NOVO NORDISK INVESTS IN...

Healthcare professional training

Since we began our operations in Thailand, we have organised training programmes regularly to [enhance the knowledge of healthcare professionals](#) (HCPs) about the latest clinical evidence in diabetes management.



Since 1996

Novo Nordisk has conducted HCP training sessions



~10,000 HCPs

have participated in training sessions



Insulin training day
July 2016

INFOBOX 6 — NOVO NORDISK INVESTS IN...

Train the Trainer programme

These programmes aim to [strengthen the expertise of healthcare professionals](#) to become advisors, mentors and teachers to other healthcare professionals.



Almost 5 years

Novo Nordisk has conducted Train the Trainer programme



Over 100 HCPs

have participated in Train the Trainer programmes



Novo Nordisk Scientific Symposium
March 2016

Well-managed diabetes may lead to better health outcomes and significant cost savings for society

Novo Nordisk believes that keeping diabetes in good control is an effective way to prevent patients from developing non-communicable diseases and related complications, thereby mitigating the escalation of financial costs for the healthcare economy.

The Sustainable Development Goals (SDGs) present an opportunity to improve the lives of people around the world.

At Novo Nordisk, we particularly welcome the recognition of the growing burden of diabetes and other non-communicable diseases and will in particular focus on our contribution towards Goal 3.4 through our business activities.⁵²

Novo Nordisk Thailand aspires to collaborate with the Royal Thai government in achieving the SDGs by strengthening the prevention of NCDs and providing more and better care for chronic conditions related to diabetes.

Good diabetes control is good for patients and the economy

Tighter diabetes control is proven to reduce the rate of complications,¹³



By 2030, target 3.4 of the Global Goals aims to reduce premature mortality from non-communicable diseases by one-third⁴³

potentially leading to improved healthcare outcomes and reduced diabetes-related costs.

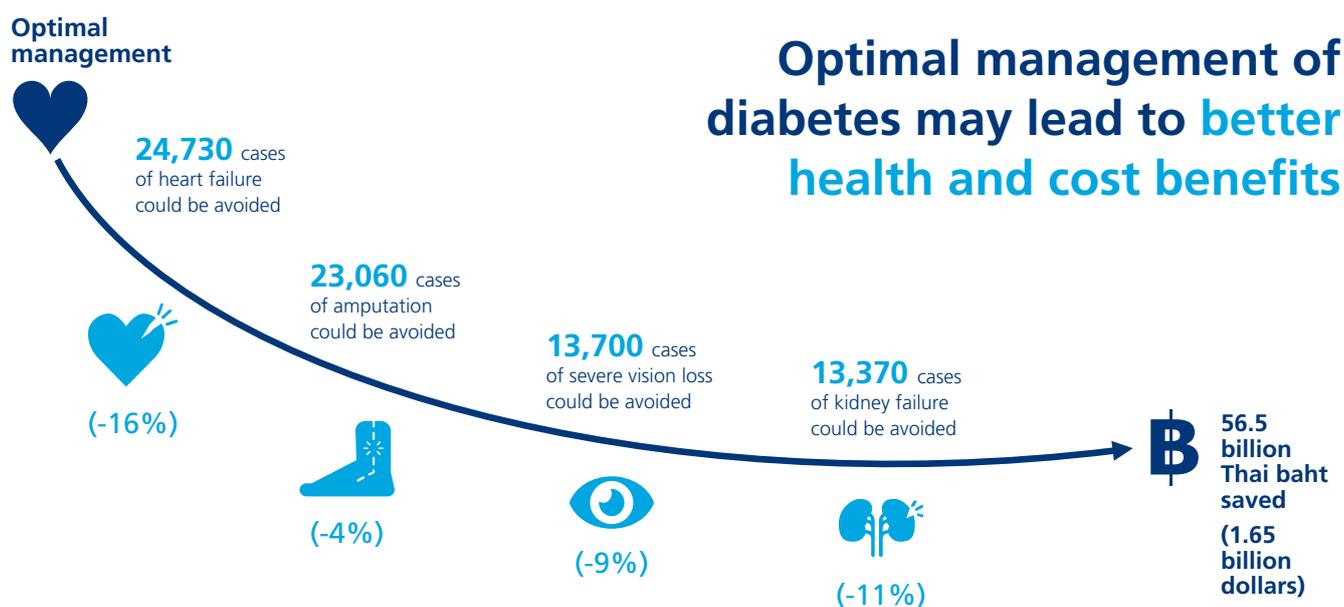
It is estimated that in Thailand, achieving near-normal blood sugar, blood pressure, body mass index and cholesterol levels may lead to substantial health and financial benefits over a 30-year period (Figure 15).²⁵

Our estimation shows that tight control of people with diabetes who are currently challenged in terms of achieving treatment targets may lead to reduced cases of complications, substantial cost savings and 15,500 avoided cases of mortality in the next 30 years.²⁵

Good diabetes control is also good for the environment

Furthermore, improvements in HbA_{1c} control have a positive impact on the environment – a component of our Triple Bottom Line. Fewer complications result in fewer surgeries, reduced resource consumption and less travel to medical appointments. A reduction in HbA_{1c} from 9% to 7% is associated with a 25% reduction in treatment-related CO₂ emissions. A reduction in HbA_{1c} from 8% to 7% is associated with a 13% reduction in treatment-related CO₂ emissions.²⁵

FIGURE 15 — POTENTIAL BENEFITS OF OPTIMAL DIABETES MANAGEMENT



Note — Calculations relate to a 30-year period and are based on the Quintiles IMS CORE Diabetes Model.⁵⁵ Diabetes treatment targets are defined by the Thailand diabetes guidelines⁸ (HbA_{1c} < 7%, blood pressure < 140/80 mmHg, LDL-C < 100 mg/dl, HDL-C ≥ 40mg/dl, triglycerides < 150 mg/dl, BMI = 22.9). The baseline cohort of the analysis is based on Thailand diabetes registry project and consists of Thai type 2 diabetes patients with poor blood sugar control (HbA_{1c}=8.1%).¹⁴

Appropriate medical treatment is only the first step towards living healthier lives

Enhancing diabetes knowledge, improving access to innovation and tighter blood sugar control can improve the quality of diabetes care. To achieve this vision, partners can collaborate together with shared expertise, knowledge and resources to defeat diabetes.

Empowering multidisciplinary care teams to deliver proactive approaches to care

By training specialists, general practitioners and nurses in the latest diabetes care practices, we can work together to empower healthcare professionals to deliver the most up-to-date services and to spot early signs of diabetes or disease progression. This will enable optimal care for patients across Thailand.

Care is best delivered in multidisciplinary teams involving specialists, nurses, pharmacists, dieticians and health educators. This has been demonstrated to improve both blood sugar control and patients' quality of life.

Access to timely screening and care for complications

To prevent escalating costs of complications, an effective screening programme can help to identify patients at risk of developing eye disease, kidney disease or other complications.

Access to timely screening for complications could be a way to mitigate growing healthcare costs. A way to achieve this could be through training of primary care and specialised physicians.

To support people who already live with diabetes-related complications, the Royal Thai government has spearheaded initiatives to provide laser eye treatments and renal replacement therapies, among other interventions. Such efforts help to treat these complications and improve the health of these patients in a timely way.

Creating equal access to diabetes care

This involves reaching out to patients outside of the Bangkok metropolitan area through the primary care network.

Novo Nordisk aims to contribute to defeating diabetes in Thailand by enabling proactive management of diabetes. Proactive management allows general practitioners to help patients achieve their blood sugar targets. It advocates for regular screening of complications, timely advice and support to patients as well as timely insulin initiation.

We invite both public and private organisations to join us in taking actions to implement sustainable solutions and work with us in our ambition to innovate diabetes care in Thailand.



CHINNAKRIT SEECHAROEN
with his father and mother
Thailand
Chinnakrit has type 1 diabetes

Changing diabetes together: Letter from the General Manager

Novo Nordisk is committed to the Triple Bottom Line principle for doing business, which means we strive to conduct our business in a financially, socially and environmentally responsible way. Our contribution to society is to discover and develop innovative biological medicines and make them accessible to patients throughout the world.

As a global leader in diabetes care, Novo Nordisk takes a specific interest in the healthcare goals of the 2030 Agenda for Sustainable Development. We support this by striving to reduce the burden of diabetes in countries where we operate. Achieving these goals requires a balanced strategy ranging from effective prevention of diabetes and other NCDs to early detection policies and appropriate access to care.

The burden of diabetes is rising significantly in Thailand, where approximately 4.8 million people live with diabetes and half of adults with diabetes are not diagnosed.

Thailand has made strong progress in building a solid healthcare system focused on providing universal access to essential medicines and policies advancing healthier lifestyles for Thai people.

Acknowledging these efforts, we believe that in order to effectively address the burden of diabetes in Thailand, we need strong public–private partnerships involving multiple stakeholders. Novo Nordisk Pharma Thailand has been committed for more than 30 years to addressing the burden of diabetes, and we have a long-term responsibility to meet the evolving needs of Thai patients.

This Blueprint for Change report, developed with support from and in partnership with the Thai Ministry of Public Health and the Thai National Health Security Office, is not only a comprehensive reference for evaluating the economic, social and human impact of diabetes and its complications in Thailand, but hopefully will also become a catalyst for initiating public–private partnerships to address diabetes complications and their burden on Thailand's healthcare system and society.



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Novo Nordisk Pharma Thailand Ltd

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GET IN TOUCH

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The Blueprint for Change Programme

The Blueprint for Change Programme is a series of case studies of how Novo Nordisk creates shared value with its Triple Bottom Line approach. The case studies speak with data and are based on extensive field research and a common methodology for value creation. Each Blueprint for Change case study seeks to strengthen the link between our approach to sustainability and its related value creation, highlighting successes and exploring challenges ahead and ways to improve.

About Novo Nordisk

Novo Nordisk is a global healthcare company with more than 90 years of innovation and leadership in diabetes care. This heritage has given us experience and capabilities that also enable us to help people defeat obesity, haemophilia, growth disorders and other serious chronic diseases. Headquartered in Denmark, Novo Nordisk employs approximately 41,700 people in 77 countries and markets its products in more than 165 countries. For more information, visit www.novonordisk.com, www.facebook.com/novonordisk, www.twitter.com/novonordisk, www.linkedin.com/company/novo-nordisk, www.youtube.com/novonordisk