

IDF DIABETES ATLAS

Sixth edition



**International
Diabetes
Federation**



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Follow-up to the Political Declaration of the High-level Meeting of the General Assembly on the Prevention and Control of Non-communicable Diseases

The Sixty-sixth World Health Assembly,

Having considered the reports to the Sixty-sixth World Health Assembly on noncommunicable diseases;¹

Recalling the Political Declaration of the High-level Meeting of the General Assembly on the Prevention and Control of Non-communicable Diseases,² which acknowledges that the global burden and threat of noncommunicable diseases constitutes one of the major challenges for development in the twenty-first century and which also requests the development of a comprehensive global monitoring framework, including a set of indicators, calls for recommendations on a set of voluntary global targets, and requests options for strengthening and facilitating multisectoral action for the prevention and control of noncommunicable diseases through effective partnership;

Welcoming the outcome document of the United Nations Conference on Sustainable Development (Rio de Janeiro, 20–22 June 2012), entitled “The future we want”,³ which commits to strengthen health systems towards the provision of equitable, universal health coverage and promote affordable access to prevention, treatment, care and support related to noncommunicable diseases, especially cancer, cardiovascular diseases, chronic respiratory diseases and diabetes, and commits to establish or strengthen multisectoral national policies for the prevention and control of noncommunicable diseases;

Taking note with appreciation of all the regional initiatives undertaken on the prevention and control of noncommunicable diseases, including the Declaration of the Heads of State and Government of the Caribbean Community entitled “Uniting to stop the epidemic of chronic noncommunicable diseases”, adopted in September 2007, the Libreville Declaration on Health and Environment in Africa, adopted in August 2008, the statement of the Commonwealth Heads of Government on action to combat noncommunicable diseases, adopted in November 2009, the

¹ Documents A66/8 and A66/9.

² United Nations General Assembly resolution 66/2.

³ United Nations General Assembly resolution 66/288.

Foreword

It is a bittersweet pleasure to be presiding over the International Diabetes Federation upon the launch of this sixth edition of the *IDF Diabetes Atlas*. The evidence published herein on the millions of people swept up by the diabetes pandemic vindicates the Federation's relentless efforts to promote solutions to this worldwide health crisis. Previous editions of the Atlas were a crucial tool in the successful campaign for a UN Resolution on diabetes and our figures informed the subsequent political declaration on non-communicable diseases. We have achieved much: diabetes is now firmly on the highest of decision-making agendas. But the figures in this edition are a harsh reminder of how far we still have to go.

Today, there are 382 million people living with diabetes. A further 316 million with impaired glucose tolerance are at high risk from the disease – an alarming number that is set to reach 471 million by 2035. Diabetes is on the rise all over the world and countries are struggling to keep pace. The misconception that diabetes is 'a disease of the wealthy' is still held by some – to the detriment of desperately needed funding to combat the pandemic. But the evidence published in the *IDF Diabetes Atlas* disproves that delusion: a staggering 80% of people with diabetes live in low- and middle-income countries, and the socially disadvantaged in any country are the most vulnerable to the disease. Today's emerging diabetes hotspots include countries in the Middle East, Western Pacific, sub-Saharan Africa and South-East Asia where economic development has transformed lifestyles. These rapid transitions are bringing previously unheard of rates of obesity and diabetes; developing countries are facing a firestorm of ill health with inadequate resources to protect their population.

By the end of 2013, diabetes will have caused 5.1 million deaths and cost USD 548 billion in healthcare spending. Without concerted action to prevent diabetes, in less than 25 years' time there will be 592 million people living with the disease. Most of those cases would be preventable. However, without a multi-sectoral, all-of-society approach, the disturbing projections in this edition of the *IDF Diabetes Atlas* will be realised.

Despite the grim picture painted by the new figures, we already have the knowledge and expertise to begin creating a brighter future for generations to come. We must increase awareness of the importance of a healthful diet and physical activity, especially for children and adolescents. Crucially though, environments have to be created that lay the foundations for healthy living. These measures are most pressing in low- and middle-income countries, precisely those which are least prepared to confront this huge-scale pandemic, and whose very development will be thwarted in its aftermath. It is essential that health professionals – particularly the primary care practitioners – receive adequate and appropriate training to be able to perform effectively on the front line against diabetes.

In the last two years, progress has been made toward driving political change for diabetes. Building on the momentum of the 2011 UN Political Declaration on non-communicable diseases (NCDs), the 66th World Health Assembly in May 2013 saw the unanimous adoption by Member States of a voluntary Global Action Plan for the prevention and control of NCDs. Diabetes is now prominent on the global health agenda, with specific targets for access to essential medicines and for halting the growth of obesity and diabetes. Still, we must not miss this opportunity. Governments and policy-makers, health professionals and those affected by the disease must remain engaged in the fight so that IDF may achieve its vision of living in a world without diabetes.

Sir Michael Hirst
President,
International Diabetes Federation



Introduction

This 6th edition of the *IDF Diabetes Atlas* once again sets the standard for evidence on the global epidemiology of diabetes. The new estimates build on the groundwork laid by previous editions, and confirm the precipitous rise in diabetes over the last few years. An astounding 382 million people are estimated to have diabetes, with dramatic increases seen in countries all over the world. The overwhelming burden of the disease continues to be shouldered by low- and middle-income countries, where four out of five people with diabetes are living. Socially and economically disadvantaged people in every country carry the greatest burden of diabetes and are often the most affected financially.

The new estimates show an increasing trend towards younger and younger people developing diabetes, a trend that is very worrisome for future generations. If current demographic patterns continue, more than 592 million people will be affected with diabetes within a generation. This figure takes into account changes only in the population and patterns of urbanisation, and is almost certainly an underestimate. Estimates of type 1 diabetes in young people also show unexplained and rapid increases in several regions along with the rise in type 2 diabetes in younger populations.

The burden of diabetes is reflected not only in the increasing numbers of people with diabetes, but also in the growing number of premature deaths due to diabetes. In 2013, roughly half of all deaths due to diabetes in adults were in people under the age of 60, and in less-developed regions like sub-Saharan Africa, that proportion climbs to 75%. As life expectancy increases, while the infectious disease burden decreases, and development drives rapid changes in lifestyles, it is the developing regions that will see the greatest increases in the burden of diabetes.

For the first time, the *IDF Diabetes Atlas* has produced estimates of high blood glucose in pregnancy. This serious and underreported condition is affecting many women and infants – an estimated 21.4 million live births in 2013. Not only does diabetes pose a grave threat to the health of a mother and her child but evidence shows high blood glucose levels during pregnancy can lead to an increased risk of type 2 diabetes later in life for the child, further contributing to the already devastating epidemic.

More high-quality studies than ever before have contributed to the estimates in this edition of the *IDF Diabetes Atlas*. Nevertheless, more studies are needed to describe the burden of diabetes in order to improve the precision of the estimates, and contribute to an evidence base that is fundamental in driving powerful advocacy for people with diabetes.

Professor Nam Han Cho

Chair,

IDF Diabetes Atlas Committee, 6th Edition

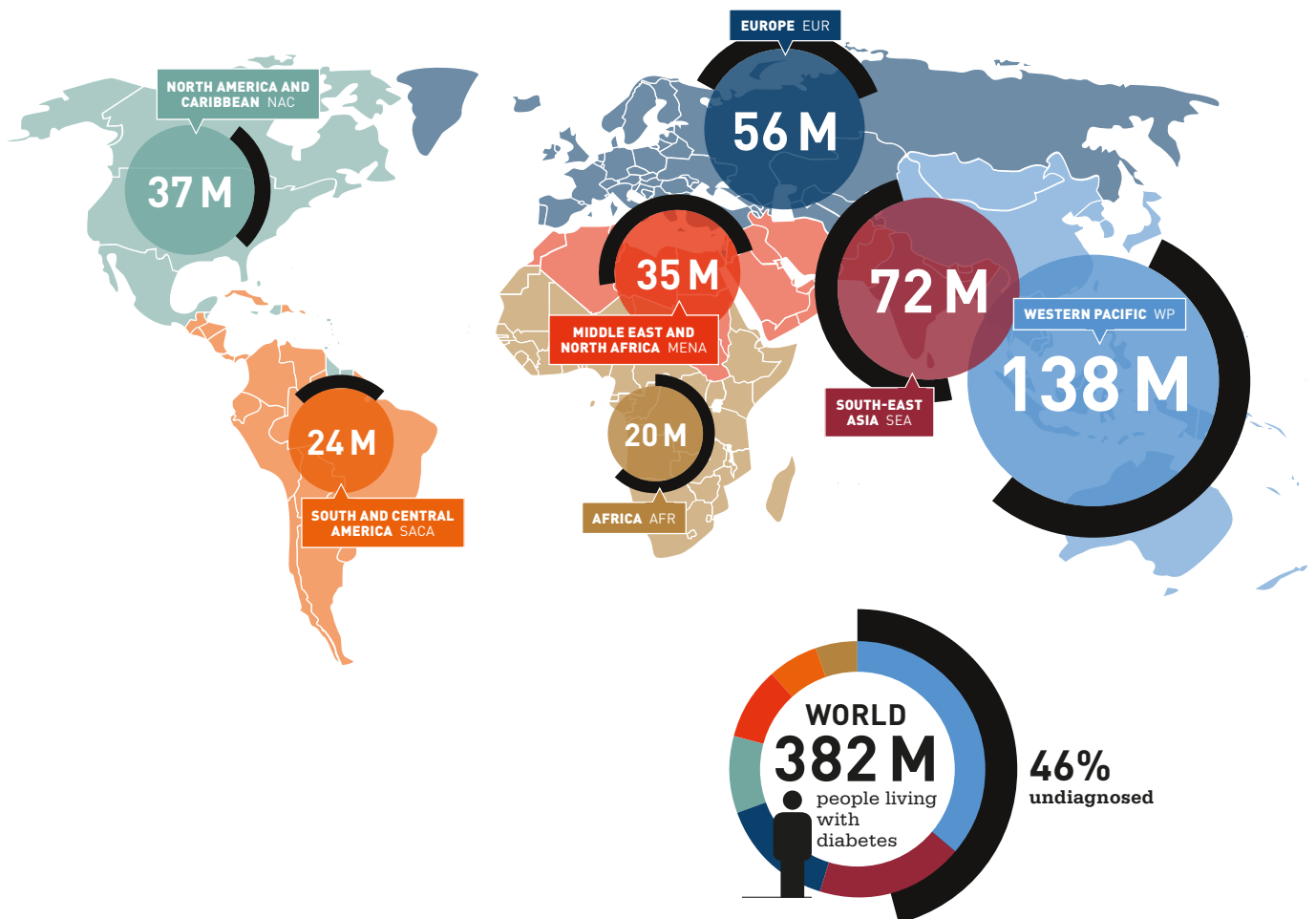


Executive summary

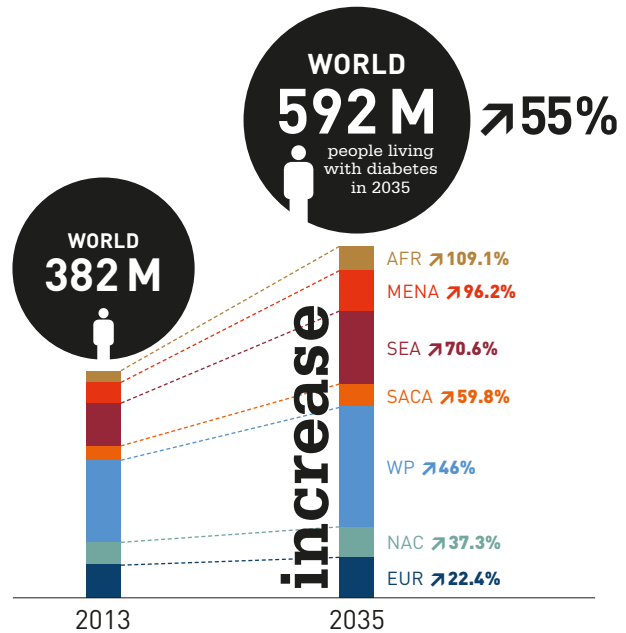
Diabetes in all its forms imposes unacceptably high human, social and economic costs on countries at all income levels. Since the publication of the first International Diabetes Federation *Diabetes Atlas* in 2000 successive editions have provided consistent evidence of the continuing growth in rates of diabetes incidence and prevalence worldwide. This 6th edition brings new evidence of the same kind, and carries a bitter but unavoidable message: despite the array of tools at our disposal to tackle the disease – effective drug therapies, advanced technology, ever-improving education and preventive strategies – the battle to protect people from diabetes and its disabling, life-threatening complications is being lost.

IDF's most recent estimates indicate that 8.3% of adults – 382 million people – have diabetes, and the number of people with the disease is set to rise beyond 592 million in less than 25 years. Yet, with 175 million of cases currently undiagnosed, a vast amount of people with diabetes are progressing towards complications unawares. Moreover, with 80% of the total number affected living in low- and middle-income countries, where the epidemic is gathering pace at alarming rates, the *IDF Diabetes Atlas'* latest figures provide a worrying indication of the future impact of diabetes as a major threat to global development.

Number of people with diabetes by IDF Region, 2013



Diabetes is a **huge and growing problem**, and the costs to society are high and escalating.



What is diabetes?

The three main types of diabetes – type 1 diabetes, type 2 diabetes and gestational diabetes – occur when the body cannot produce enough of the hormone insulin or cannot use insulin effectively. Insulin acts as a key that lets the body’s cells take in glucose and use it as energy.

People with type 1 diabetes, the result of an autoimmune process with very sudden onset, need insulin therapy to survive. Type 2 diabetes, on the other hand, can go unnoticed and undiagnosed for years. In such cases, those affected are unaware

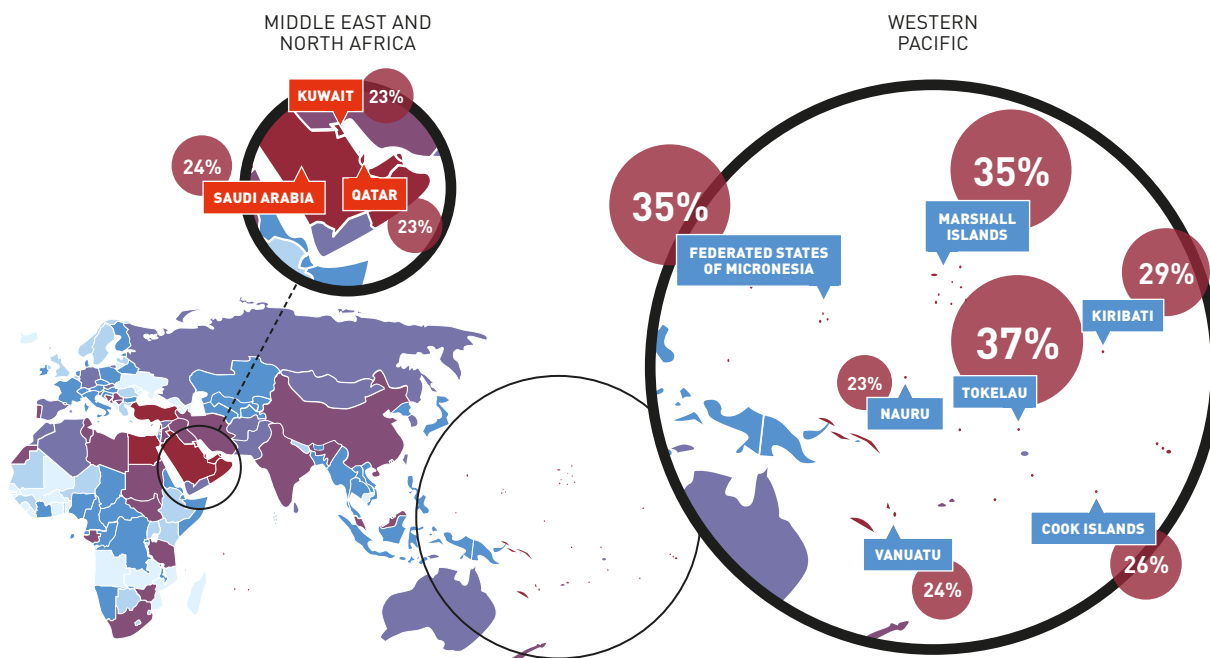
of the long-term damage being caused by their disease. Gestational diabetes, which appears during pregnancy, can lead to serious health risks to the mother and her infant and increase the risk for developing type 2 diabetes later in life.

All types of diabetes require close collaboration between those affected and their healthcare providers in order to prevent a range of costly, dangerous complications, which can provoke damage to the eyes, kidneys, feet and heart, and, left untreated, result in early death.



Top 10 countries/territories for prevalence* (%) of diabetes (20-79 years), 2013

* comparative prevalence



The Global Burden

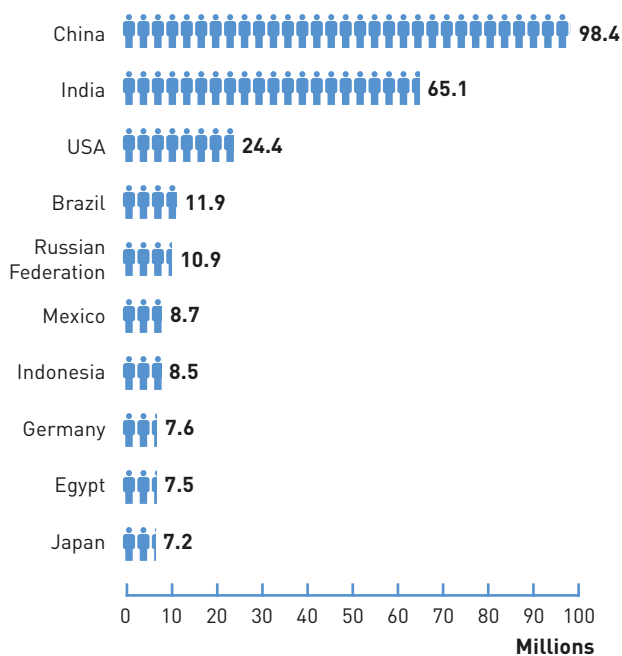
The majority of the 382 million people with diabetes are aged between 40 and 59, and 80% of them live in low- and middle-income countries. All types of diabetes are on the increase, type 2 diabetes in particular: the number of people with diabetes will increase by 55% by 2035.

An additional 21 million cases of high blood glucose in pregnancy are estimated to contribute to the global burden of diabetes. That is equivalent to 17% of live births to women in 2013 that had some form of high blood glucose in pregnancy.

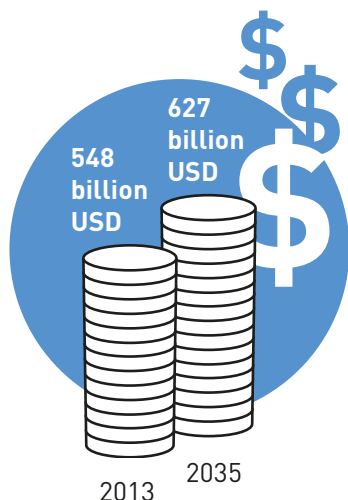
In human as well as financial terms, the burden of diabetes is enormous, provoking 5.1 million deaths and taking up some USD 548 billion dollars in health spending (11% of the total spent worldwide) in 2013.

More than **21 million** live births were affected by diabetes during pregnancy in 2013.

Top 10 countries/territories of number of people with diabetes (20-79 years), 2013



**Global health expenditure due to diabetes
(20-79 years)**



Diabetes caused **5.1 million deaths** in 2013. Every six seconds a person dies from diabetes.

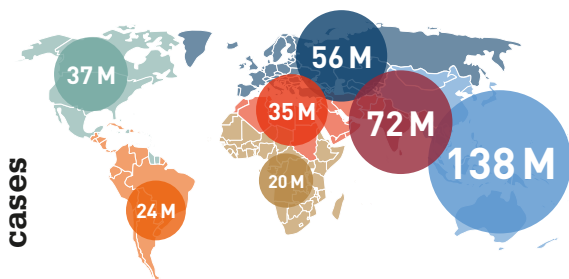
Regional overviews

Different regions are being affected to widely differing degrees. With more than 138 million people affected, the Western Pacific has more people with diabetes than any other region. At the other end of the regional diabetes ranking, Africa's diabetes population is currently the smallest among the regions. However, this is set to double by 2035, and, ominously for Africa's capacity to develop, more than three-quarters of deaths from diabetes in 2013 occurred in people under 60 – that is to say, in their prime productive years.

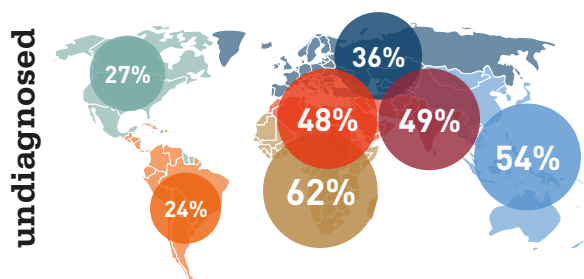
The outlook is similarly worrying in South and Central America, where the diabetes population is projected to increase by 60% by 2035. Rapid development has driven a fast-growing epidemic of diabetes in South-East Asia, accounting for close to

one-fifth of all cases worldwide. Similarly, wealth and development in the Middle East and North Africa has led to high proportions of diabetes where one in ten adults in the region have the disease.

A look at health spending on diabetes by region reveals huge disparities in responses to the epidemic. Two regions spent more on diabetes than the rest of the regions put together: North America and Caribbean, with an estimated USD 263 billion – equal to nearly half the world's health expenditure on diabetes; and Europe with USD 147 billion. Despite their growing diabetes populations, spending in South-East Asia and Africa accounted for less than 1% of all global health expenditure on the disease.

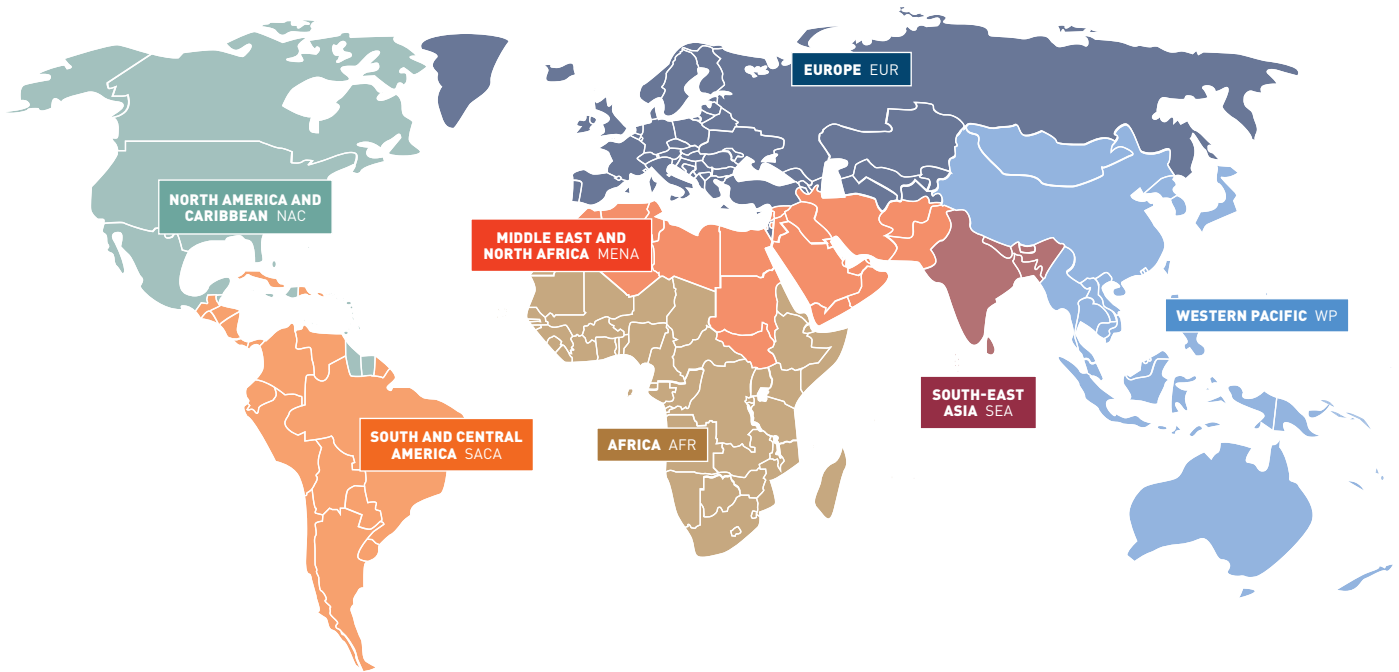


Number of people with diabetes (20-79 years), 2013

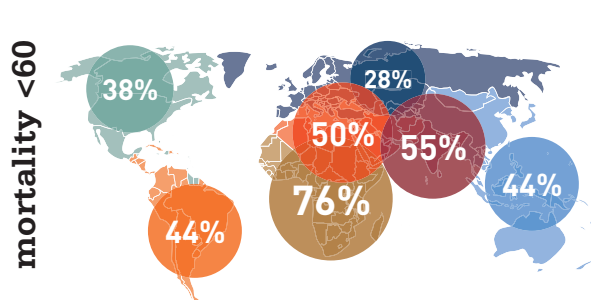


Proportion of cases of diabetes (20-79 years) that are undiagnosed, 2013

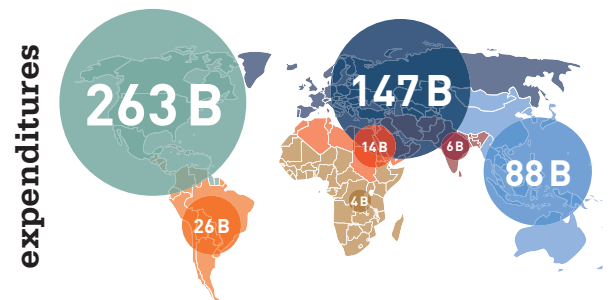
IDF Regions and global projections of the number of people with diabetes (20-79 years), 2013 and 2035



IDF REGION	2013 MILLIONS	2035 MILLIONS	INCREASE %
Africa	19.8	41.4	109%
Middle East and North Africa	34.6	67.9	96%
South-East Asia	72.1	123	71%
South and Central America	24.1	38.5	60%
Western Pacific	138.2	201.8	46%
North America and Caribbean	36.7	50.4	37%
Europe	56.3	68.9	22%
World	381.8	591.9	55%



Proportion of deaths due to diabetes in people under 60 years of age, 2013



Health expenditure (USD) due to diabetes (20-79 years), 2013

Global issues in diabetes

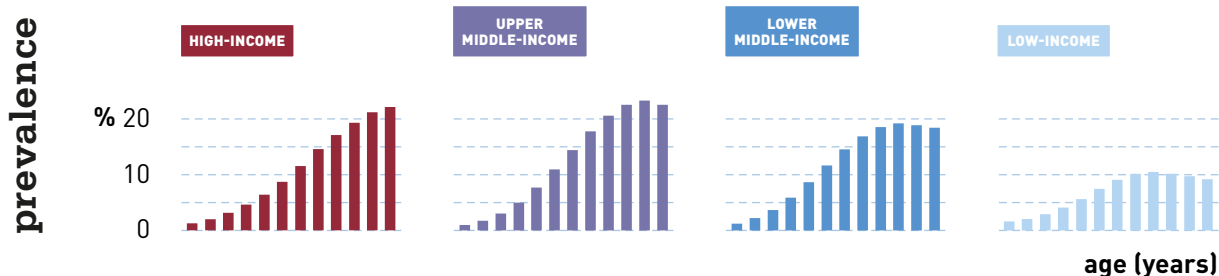
Despite the predominantly urban impact of the epidemic, type 2 diabetes is fast becoming a major health concern in rural communities in low- and middle-income countries.

No countries are escaping the diabetes epidemic, and in states and territories worldwide it is the poor and disadvantaged who are suffering most. Indigenous communities are among those especially vulnerable to diabetes.

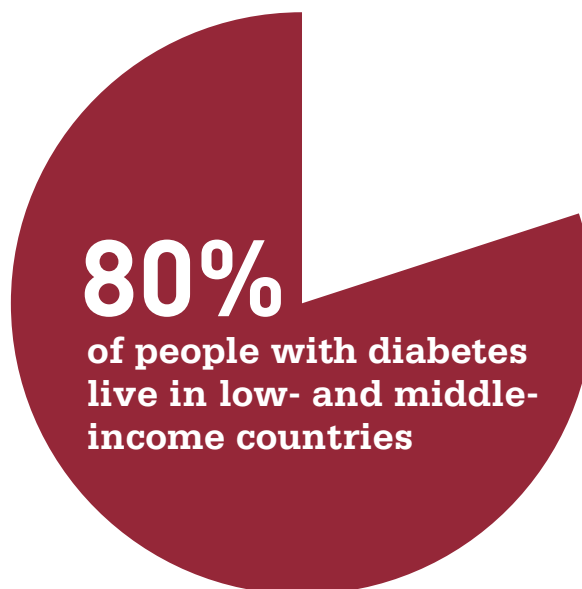
Indigenous peoples are especially vulnerable to diabetes.



Prevalence (%) of diabetes (20-79 years) by income group and age



All nations – **rich and poor** – are suffering the impact of the diabetes epidemic.



Linking local to global

IDF plays a pivotal role in efforts to reduce exponentially the global impact of diabetes, catalysing grass roots activism, influencing global health and development policy, and driving the global agenda on diabetes. In calling for a specific health target

in the post-2015 development framework, the Federation is heading a campaign for an all-of-society approach to diabetes prevention, care and support.

As a leading supporter of people and organisations working in diabetes education and care, IDF produces educational resources designed to improve the expertise of diabetes educators and other healthcare professionals. IDF publications are used widely around the world, and the Federation's programmes, campaigns and events provide a global awareness-raising platform for people with diabetes and those at risk.

Diabetes is more than a health issue and requires concerted **policy action** across many sectors.



Resources and solutions

The International Diabetes Federation (IDF) is an umbrella organisation of over 200 national diabetes associations in more than 160 countries. It represents the interests of the growing number of people with diabetes and those at risk. The Federation has been leading the global diabetes community since 1950. IDF's mission is to promote diabetes care, prevention and a cure worldwide.

IDF is committed to promoting best practice in diabetes through guidelines, position statements, and tools for health professionals to improve the lives of people with diabetes.

There are **solutions** for managing and curbing the diabetes epidemic.

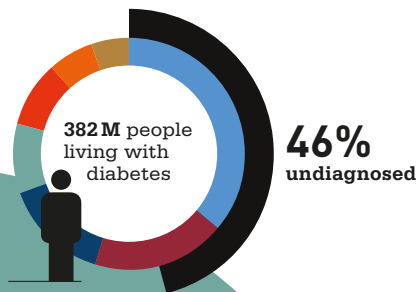






What is diabetes?

There are
3 main types
of diabetes:
→ type 1 diabetes
→ type 2 diabetes
→ gestational
diabetes



People with type 2
diabetes can remain
UNDIAGNOSED
for many years, unaware of
the **LONG-TERM DAMAGE**
being caused by the disease

People with type 1 diabetes will die without insulin



Effective management of diabetes requires a partnership between the person with diabetes and health professionals



Poorly managed diabetes leads to serious **COMPLICATIONS** and early death

People with diabetes have an increased risk of developing a number of serious health problems

1

What is diabetes?

Diabetes is a chronic disease that occurs when the body cannot produce enough insulin or cannot use insulin effectively.¹ Insulin is a hormone produced in the pancreas that allows glucose from food to enter the body's cells where it is converted into energy needed by muscles and tissues to function. A person with diabetes does not absorb glucose properly, and glucose remains circulating in the blood (a condition known as hyperglycaemia) damaging body tissues over time. This damage can lead to disabling and life-threatening health complications.

There are three main types of diabetes:

- type 1 diabetes
- type 2 diabetes
- gestational diabetes

Type 1 diabetes

Type 1 diabetes is caused by an autoimmune reaction, where the body's defence system attacks the insulin-producing beta cells in the pancreas. As a result, the body can no longer produce the insulin it needs. Why this occurs is not fully understood. The disease can affect people of any age, but usually occurs in children or young adults. People with this

form of diabetes need insulin every day in order to control the levels of glucose in their blood. Without insulin, a person with type 1 diabetes will die.

Type 1 diabetes often develops suddenly and can produce symptoms such as:

- abnormal thirst and a dry mouth
- frequent urination
- lack of energy, extreme tiredness
- constant hunger
- sudden weight loss
- slow-healing wounds
- recurrent infections
- blurred vision

People with type 1 diabetes can lead a normal, healthy life through a combination of daily insulin therapy, close monitoring, a healthy diet, and regular physical exercise.

The number of people who develop type 1 diabetes is increasing. The reasons for this are still unclear but may be due to changes in environmental risk factors, early events in the womb, diet early in life, or viral infections.

Type 2 diabetes

Type 2 diabetes is the most common type of diabetes. It usually occurs in adults, but is increasingly seen in children and adolescents. In type 2 diabetes, the body is able to produce insulin but either this is not sufficient or the body is unable to respond to its effects (also known as insulin resistance), leading to a build-up of glucose in the blood.

Many people with type 2 diabetes remain unaware of their illness for a long time because symptoms may take years to appear or be recognised, during which time the body is being damaged by excess blood glucose. They are often diagnosed only when complications of diabetes have already developed (see below, Diabetes complications).

Although the reasons for developing type 2 diabetes are still not known, there are several important risk factors. These include:

- obesity
- poor diet
- physical inactivity
- advancing age
- family history of diabetes
- ethnicity
- high blood glucose during pregnancy affecting the unborn child

In contrast to people with type 1 diabetes, the majority of those with type 2 diabetes usually do not require daily doses of insulin to survive. Many people are able to manage their condition through a healthy diet and increased physical activity or oral medication. However, if they are unable to regulate their blood glucose levels, they may be prescribed insulin.

The number of people with type 2 diabetes is growing rapidly worldwide. This rise is associated with economic development, ageing populations, increasing urbanisation, dietary changes, reduced physical activity, and changes in other lifestyle patterns.²

Gestational diabetes

Women who develop a resistance to insulin and subsequent high blood glucose during pregnancy are said to have gestational diabetes (also referred to as gestational diabetes mellitus or GDM). Gestational diabetes tends to occur around the 24th week of pregnancy. The condition arises because the action of insulin is blocked, probably by hormones produced by the placenta.

As gestational diabetes normally develops later in pregnancy, the unborn baby is already well-formed but still growing. The immediate risk to the baby is therefore not as severe as for those whose mother had type 1 diabetes or type 2 diabetes before pregnancy (a condition known as diabetes in pregnancy). Nonetheless, uncontrolled gestational diabetes can have serious consequences for both the mother and her baby.

Poorly managed blood glucose during pregnancy can lead to a significantly larger than average baby (a condition known as fetal macrosomia), which makes a normal birth difficult and risky. The newborn will be at risk for shoulder injury and breathing problems. In many cases, a caesarean section is necessary, putting the mother's health at risk, particularly in low-resource settings, where access to good healthcare is limited. For women living in outlying rural areas there is a life-threatening risk from prolonged obstructed labour. There also exists the risk of preeclampsia, a condition where sudden high blood pressure threatens the health (and in some cases the life) of the mother and her baby.

Gestational diabetes in mothers normally disappears after birth. However, women who have had gestational diabetes are at a higher risk of developing gestational diabetes in subsequent pregnancies and of developing type 2 diabetes later in life. Babies born to mothers with gestational diabetes also have a higher lifetime risk of obesity and developing type 2 diabetes.

Women with gestational diabetes or diabetes in pregnancy need to monitor and control their blood glucose levels to minimise risks to the baby. Normally, this can be done by taking up a healthy diet and moderate exercise, but in some cases insulin or oral medication may be needed as well.

Impaired glucose tolerance and impaired fasting glucose

People whose blood glucose levels are high but not as high as those in people with diabetes are said to have impaired glucose tolerance (commonly referred to as IGT) or impaired fasting glucose (IFG). IGT is defined as high blood glucose levels after eating; whereas IFG is defined as high blood glucose after a period of fasting. The term 'prediabetes' is also used to describe people with these conditions – a 'grey area' between normal glucose levels and diabetes.

People with IGT are at high risk of developing type 2 diabetes. Unsurprisingly, IGT shares many characteristics with type 2 diabetes and is associated with obesity, advancing age and the inability of the body to use the insulin it produces. Not everyone with IGT goes on to develop type 2 diabetes: a large bank of evidence supports the effectiveness of lifestyle interventions – healthy diet and physical exercise – to prevent the progression to diabetes.³

Diabetes complications

People with diabetes are at risk of developing a number of disabling and life-threatening health problems. Consistently high blood glucose levels can lead to serious diseases affecting the heart and blood vessels, eyes, kidneys, and nerves. People with diabetes are also at increased risk of developing infections. In almost all high-income countries, diabetes is a leading cause of cardiovascular disease, blindness, kidney failure, and lower-limb amputation. As the prevalence of type 2 diabetes grows in low- and middle-income countries, so too does the impact of these costly – in both human and economic terms – complications. Maintaining blood glucose levels, blood pressure and cholesterol close to normal can help delay or prevent diabetes complications. People with diabetes need regular monitoring for complications.

Cardiovascular disease

Cardiovascular disease is the most common cause of death and disability among people with diabetes. The cardiovascular diseases that accompany diabetes include angina, myocardial infarction (heart attack), stroke, peripheral artery disease, and congestive heart failure. In people with diabetes, high blood pressure, high cholesterol, high blood glucose and other risk factors contribute to the increased risk of cardiovascular complications.

Kidney disease

Kidney disease (nephropathy) is far more common in people with diabetes than in people without diabetes; and diabetes is one of the leading causes of chronic kidney disease. The disease is caused by damage to small blood vessels, which can cause the kidneys to be less efficient, or to fail altogether. Maintaining near-normal levels of blood glucose and blood pressure can greatly reduce the risk of nephropathy.

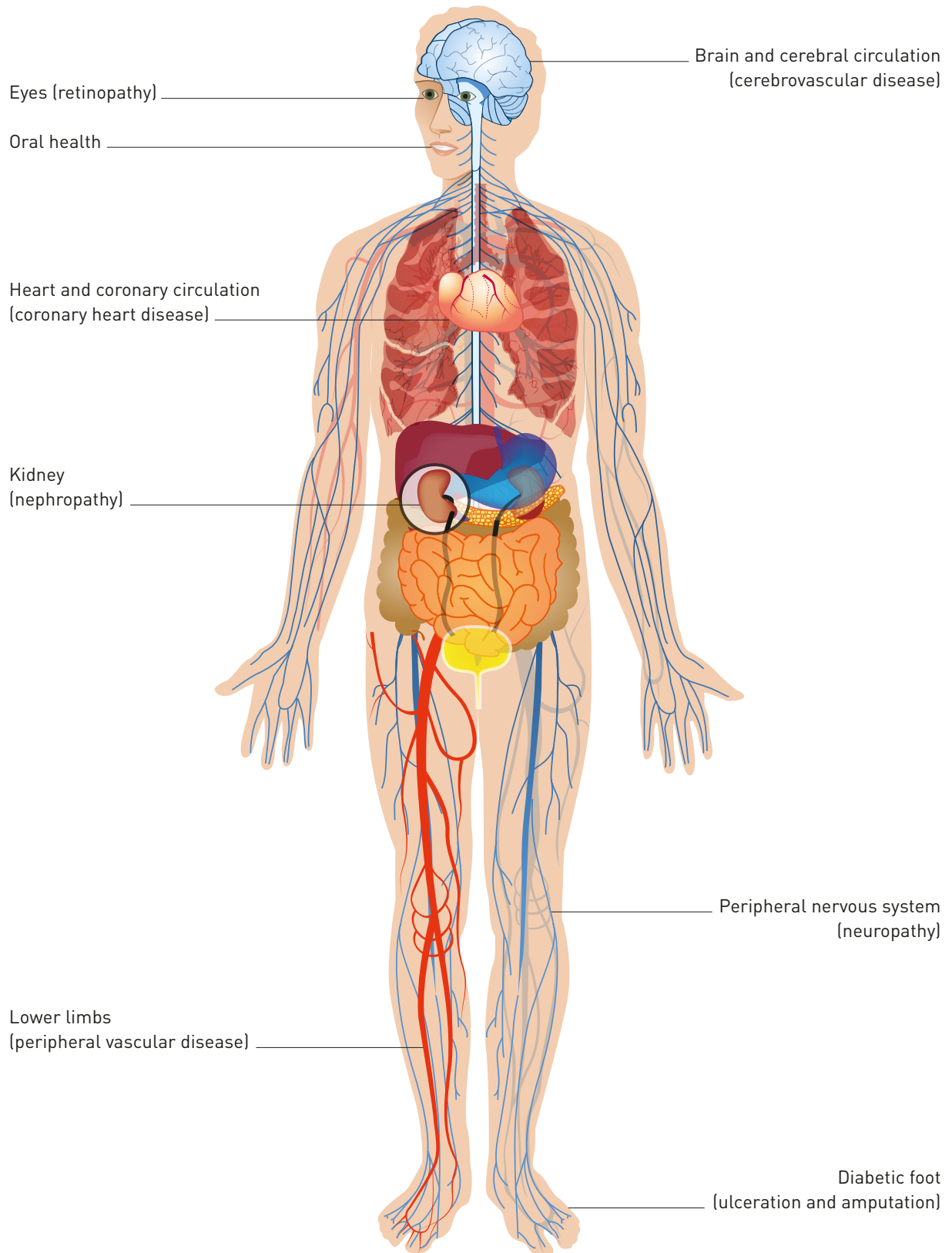
Eye disease

Many people with diabetes develop some form of eye disease (retinopathy), which can damage vision or provoke blindness. Persistently high levels of blood glucose, together with high blood pressure and high cholesterol, are the main causes of retinopathy. The network of blood vessels that supply the retina can become blocked and damaged in retinopathy, leading to permanent loss of vision. Retinopathy can be managed through regular eye checks and by keeping blood glucose levels close to normal.

Nerve damage

When blood glucose and blood pressure are excessively high, diabetes can provoke damage to nerves throughout the body (neuropathy). This damage can lead to problems with digestion and urination, erectile dysfunction and a number of other functions. The most commonly affected areas are the extremities, particularly the feet. Nerve damage in these areas is called peripheral neuropathy, and can lead to pain, tingling, and loss of feeling. Loss of feeling is particularly dangerous because it can allow injuries to go unnoticed, leading to serious infections and ulceration, diabetic foot disease, and major amputations.

Figure 1.1 The major diabetes complications



Diabetic foot

People with diabetes may develop a number of different foot problems as a result of damage to nerves and blood vessels. These problems can easily lead to infection and ulceration, which increase a person's risk of amputation. People with diabetes face a risk of amputation that may be more than 25 times greater than that in people without diabetes.⁴ However, with good management, a large proportion of amputations can be prevented. Even when a person undergoes amputation, the remaining leg – and the person's life – can be saved by good follow-up care from a multi-disciplinary foot team.⁴ People with diabetes must examine their feet regularly.

Pregnancy complications

Women with any type of diabetes during pregnancy risk a number of complications if they do not carefully monitor and manage their condition. Women with diabetes require detailed planning and close monitoring before and during pregnancy to minimise complications. High blood glucose during pregnancy can lead to fetal abnormalities and cause it to gain excess size and weight, and overproduce insulin. These can lead to problems at delivery, injuries to the child and mother, and a sudden drop in blood glucose (hypoglycaemia) in the child after birth. Children who are exposed for a long time to high blood glucose in the womb are at higher risk of developing type 2 diabetes later in life.

Other complications

Oral health

Diabetes can pose a threat to oral health. For example, there is an increased risk of inflammation of the gums (gingivitis) in people with poor glucose control. Gingivitis in turn is a major cause of tooth loss and may also increase the risk of cardiovascular disease.

Sleep apnoea

Recent research demonstrates the likelihood of a relationship between type 2 diabetes and obstructive sleep apnoea. Estimates suggest that up to 40% of people with sleep apnoea have diabetes, although the incidence of new diabetes in people with sleep apnoea is not known.⁵ In people with type 2 diabetes, sleep apnoea may have effects on their ability to control blood glucose.

Box 1.1 Insulin

Insulin is a hormone that is produced in the pancreas. Insulin allows glucose to enter the body's cells, where it is converted into energy.

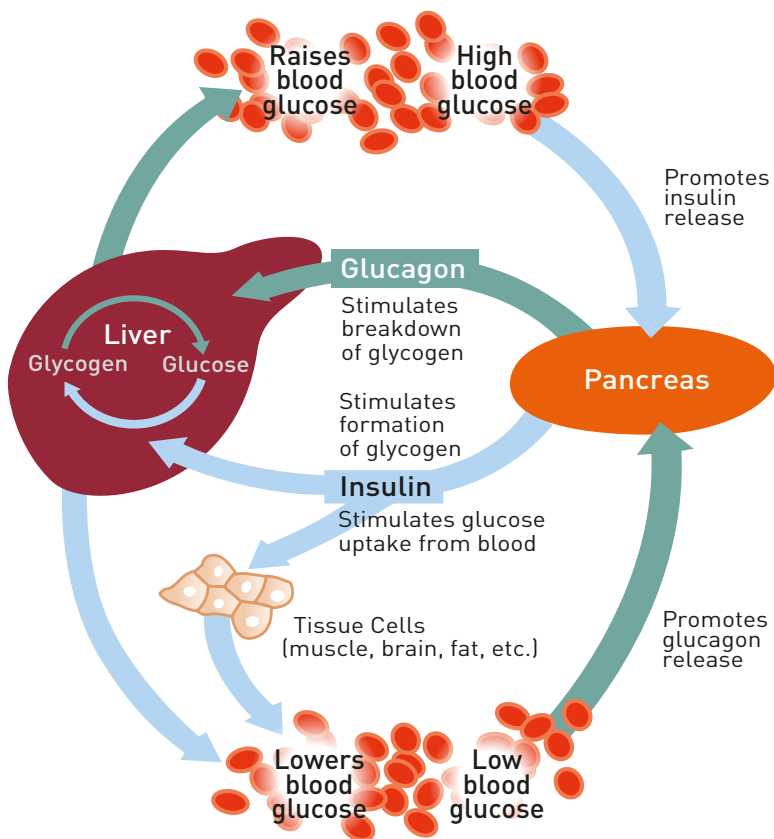
People with type 1 diabetes cannot survive without daily insulin doses. Some people with type 2 diabetes or gestational diabetes also need doses of insulin together with other medication.

In Canada in 1921, scientist Frederick Banting and medical student Charles Best isolated a substance from the pancreas of dogs, which they named isletin – and which is now known as insulin. In a series of experiments, they found that a pancreatectomised dog could be kept alive with injections of isletin. The following year, after much laboratory work to purify

insulin extracted from a fetal calf, a 14-year-old boy called Leonard Thompson became the first person with diabetes to receive an insulin injection, and his condition improved significantly. Prior to the discovery of insulin, people with diabetes were put on a starvation diet and had no hope of survival.

News of the success with insulin spread very quickly, and demand for the drug skyrocketed worldwide. Since then, huge advances have been made in research and development. However, nearly a century since its discovery, people with type 1 diabetes in many parts of the world cannot access insulin – either because they cannot afford to pay for it or because it is not readily available – and die soon after developing diabetes.

Figure 1.2 Insulin production and action







The global burden

382 million people
have diabetes

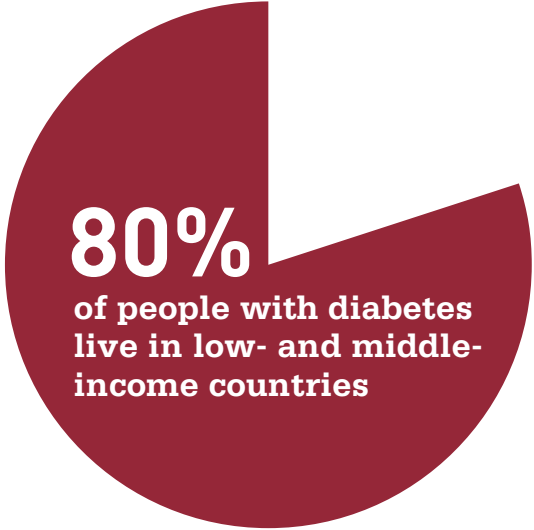
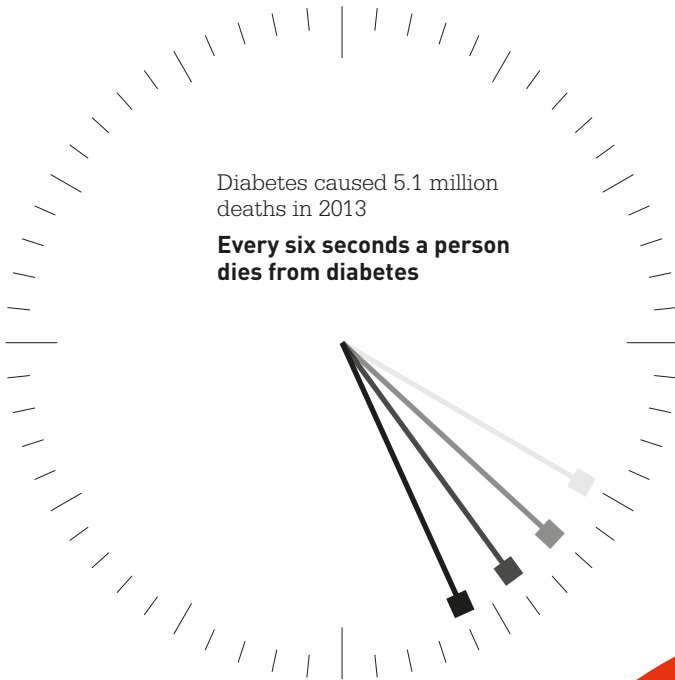
By **2035** this will rise
to **592 MILLION**



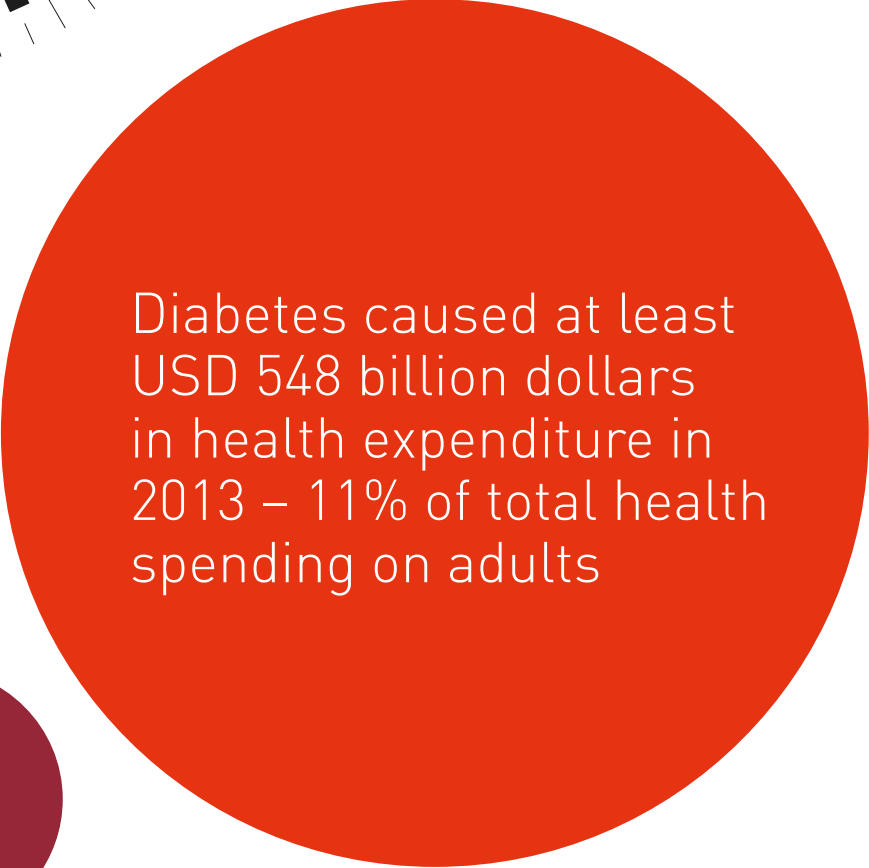
The number
of people with
type 2 diabetes
is increasing
in every country

The greatest
number of people
with diabetes are
between 40 and
59 years of age

175 million people
with diabetes are
undiagnosed



More than **79,000 children** developed type 1 diabetes in 2013



More than **21 million** live births were affected by diabetes during pregnancy in 2013

2

The global burden

Diabetes and impaired glucose tolerance

Diabetes is one of the most common non-communicable diseases (NCDs). It is the fourth or fifth leading cause of death in most high-income countries and there is substantial evidence that it is epidemic in many economically developing and newly industrialised countries.

Diabetes is undoubtedly one of the most challenging health problems of the 21st century.

The number of studies describing the possible causes and distribution of diabetes over the last 20 years has been extraordinary. These studies continue to confirm that it is the low- and middle-income countries that face the greatest burden of diabetes. However, many governments and public health planners remain largely unaware of the current magnitude of and future potential for increases in diabetes and its serious complications.

Population-based diabetes studies consistently show that a substantial proportion of those found to have diabetes had not been previously diagnosed. Many people remain undiagnosed largely because there are few symptoms during the early years of type 2 diabetes, or those symptoms may not be recognised as being related to diabetes.

In addition to diabetes, impaired glucose tolerance (IGT), in which blood glucose levels are higher than normal but not as high as in diabetes, is also a major public health problem. People with IGT have a high risk of developing diabetes as well as an increased risk of cardiovascular disease.

Prevalence and projections

In this edition of the *IDF Diabetes Atlas*, the prevalence of diabetes and IGT are estimated for the years 2013 and 2035. Data are provided for 219 countries and territories, grouped into the seven IDF Regions: Africa (AFR), Europe (EUR), Middle East and North Africa (MENA), North America and Caribbean (NAC), South and Central America (SACA), South-East Asia (SEA), and the Western Pacific (WP).

Full details of the methods used to generate the prevalence estimates for diabetes in adults and the proportion undiagnosed, including how the data sources were evaluated and processed, can be found in the journal *Diabetes Research and Clinical Practice* and on the *IDF Diabetes Atlas* website: www.idf.org/diabetesatlas.

Complications

Complications due to diabetes (Chapter 1) are a major cause of disability, reduced quality of life, and death. Diabetes complications can affect various parts of the body, manifesting in different ways in different people.

There are no internationally agreed standards for diagnosing and assessing diabetes complications. Due to the variety of methods of these studies, it is difficult to make comparisons between different populations. However, it is clear that diabetes

complications are very common, with at least one present in a large proportion of people with diabetes (50% or more in some studies) at the time of diagnosis.

In this edition of the *IDF Diabetes Atlas*, estimates of complications were not included due to the lack of available comparable data. International standards for measuring complications are essential to provide accurate estimates of this major cause of disability.

AT A GLANCE	2013	2035
Total world population (billions)	7.2	8.7
Adult population (20-79 years, billions)	4.6	5.9
DIABETES AND IGT (20-79 YEARS)		
Diabetes		
Global prevalence (%)	8.3	10.1
Comparative prevalence (%)	8.3	8.8
Number of people with diabetes (millions)	382	592
IGT		
Global prevalence (%)	6.9	8.0
Comparative prevalence (%)	6.9	7.3
Number of people with IGT (millions)	316	471

Table 2.1 Top 10 countries/territories for prevalence* (%) of diabetes (20-79 years), 2013 and 2035

COUNTRY/ TERRITORY	2013 (%)	COUNTRY/ TERRITORY	2035 (%)
Tokelau	37.5	Tokelau	37.9
Federated States of Micronesia	35.0	Federated States of Micronesia	35.1
Marshall Islands	34.9	Marshall Islands	35.0
Kiribati	28.8	Kiribati	28.9
Cook Islands	25.7	Cook Islands	25.7
Vanuatu	24.0	Saudi Arabia	24.5
Saudi Arabia	24.0	Vanuatu	24.2
Nauru	23.3	Nauru	23.3
Kuwait	23.1	Kuwait	23.2
Qatar	22.9	Qatar	22.8

*comparative prevalence

Table 2.2 Top 10 countries/territories for number of people with diabetes (20-79 years), 2013 and 2035

COUNTRY/ TERRITORY	2013 MILLIONS	COUNTRY/ TERRITORY	2035 MILLIONS
China	98.4	China	142.7
India	65.1	India	109.0
United States of America	24.4	United States of America	29.7
Brazil	11.9	Brazil	19.2
Russian Federation	10.9	Mexico	15.7
Mexico	8.7	Indonesia	14.1
Indonesia	8.5	Egypt	13.1
Germany	7.6	Pakistan	12.8
Egypt	7.5	Turkey	11.8
Japan	7.2	Russian Federation	11.2

2.1 Diabetes

Diabetes can be found in every country. Without effective prevention and management programmes, the burden will continue to increase worldwide.¹

Type 2 diabetes accounts for 85% to 95% of all diabetes in high-income countries and may account for an even higher percentage in low- and middle-income countries.¹ Type 2 diabetes is a common condition and a serious global health problem. In most countries diabetes has increased alongside rapid cultural and social changes: ageing populations, increasing urbanisation, dietary changes, reduced physical activity and unhealthy behaviours.¹

Type 1 diabetes, although less common than type 2 diabetes, is increasing each year in both rich and poor countries. In most high-income countries, the majority of diabetes in children and adolescents is type 1 diabetes.

Gestational diabetes is common and, like obesity and type 2 diabetes, is increasing throughout the world.² The risk of developing type 2 diabetes is high in women who have had gestational diabetes. The reported prevalence of gestational diabetes varies widely among different populations around the world. Much of the variability is due to differences in diagnostic criteria and study populations.

Prevalence

Some 382 million people worldwide, or 8.3% of adults, are estimated to have diabetes. About 80% live in low- and middle-income countries. If these trends continue, by 2035, some 592 million people, or one adult in 10, will have diabetes. This equates to approximately three new cases every 10 seconds, or almost 10 million per year. The largest increases will take place in the regions where developing economies are predominant.

Age distribution

Almost half of all adults with diabetes are between the ages of 40 and 59 years. More than 80% of the 184 million people with diabetes in this age group live in low- and middle-income countries.

This age group will continue to comprise the greatest number of people with diabetes in the coming years. By 2035, it is expected that the number will increase to 264 million. Again, more than 86% will be living in low- and middle-income countries.

Gender distribution

There is little gender difference in the global numbers of people with diabetes for 2013 or 2035. There are about 14 million more men than women with diabetes (198 million men vs 184 million women). However, this difference is expected to increase to 15 million (303 million men vs 288 million women) by 2035.

Urban/rural distribution

There are more people with diabetes living in urban (246 million) than in rural (136 million) areas although the numbers for rural areas are on the increase. In low- and middle-income

countries, the number of people with diabetes in urban areas is 181 million, while 122 million live in rural areas. By 2035, the difference is expected to widen, with 347 million people living in urban areas and 145 million in rural areas.

Figure 2.1 Prevalence* (%) of diabetes (20-79 years) by IDF Region, 2013 and 2035

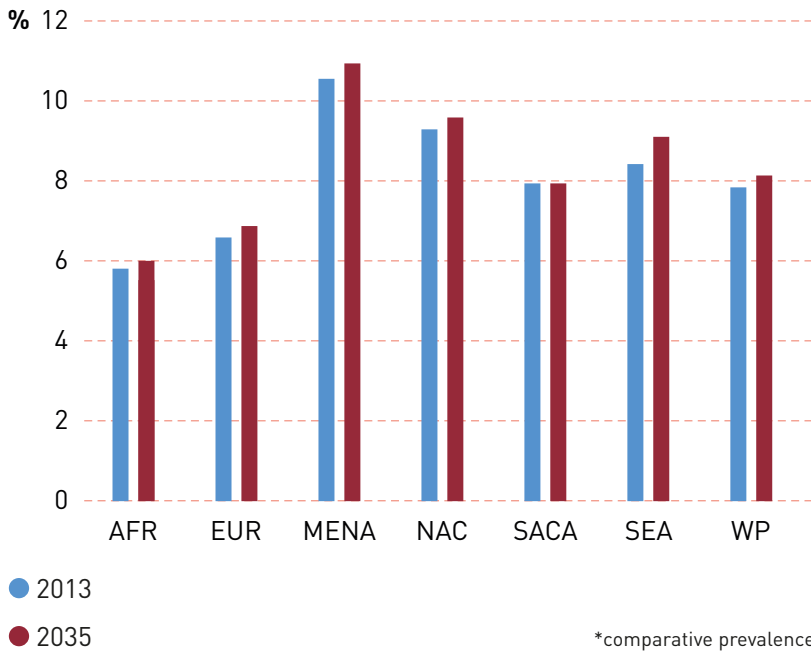
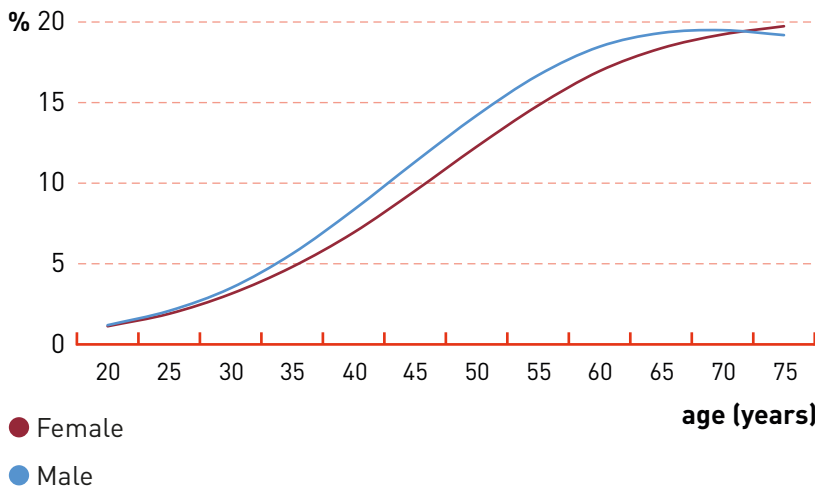
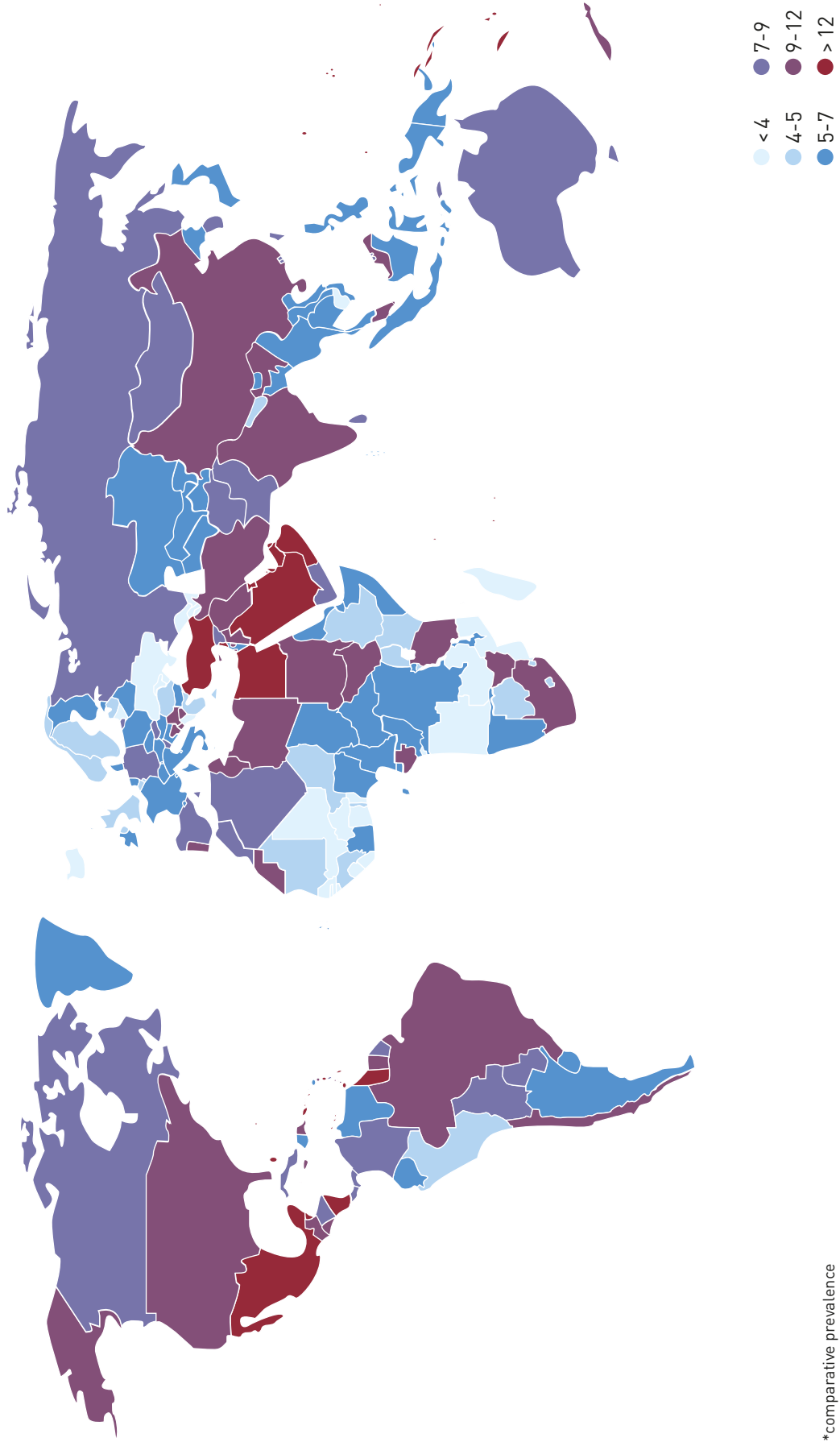


Figure 2.2 Prevalence (%) of people with diabetes by age and sex, 2013

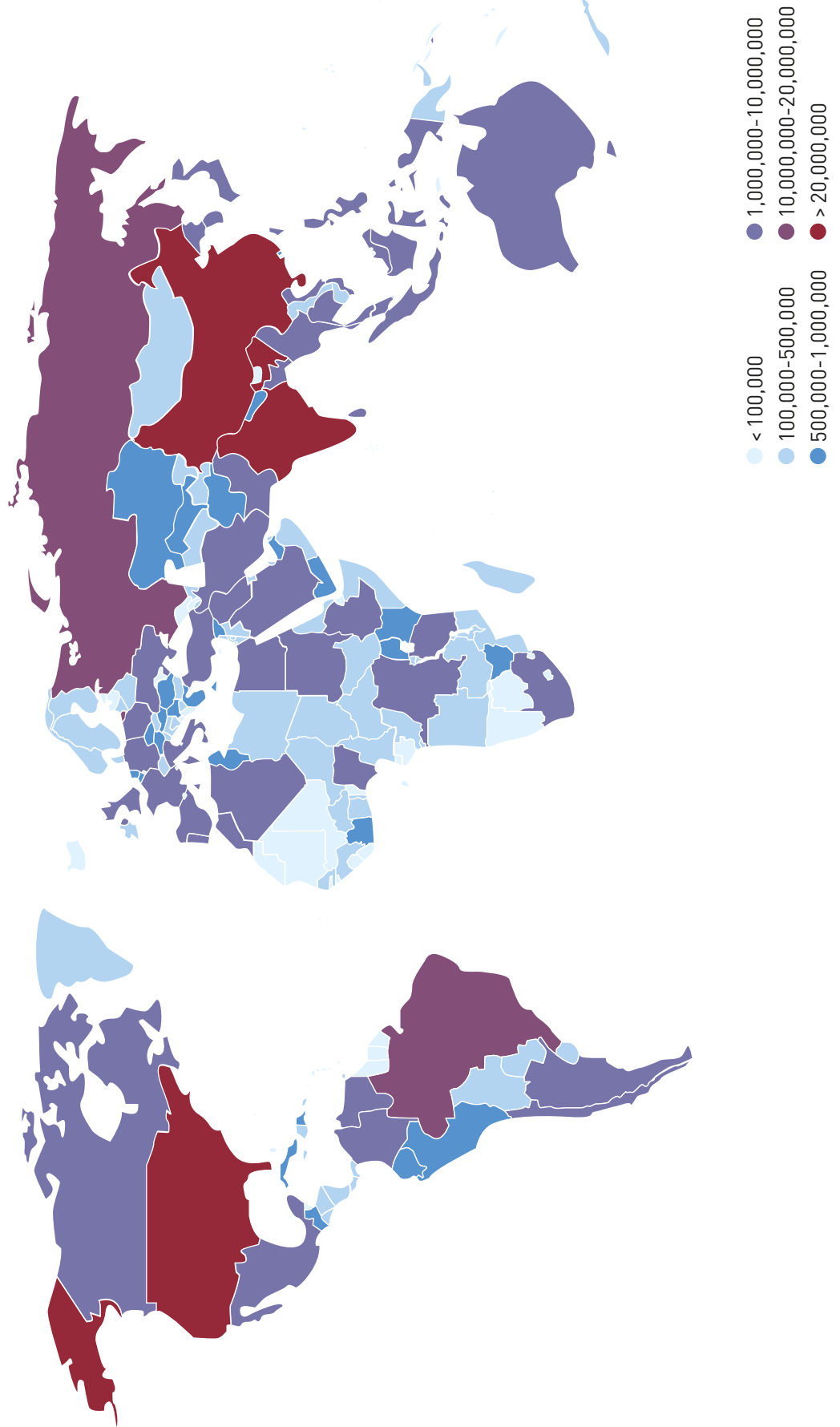


Map 2.1 Prevalence* (%) of diabetes in adults (20-79 years), 2013



*comparative prevalence

Map 2.2 Number of people with diabetes (20-79 years), 2013



2.2 Undiagnosed diabetes

IDF estimates that as many as 175 million people worldwide, or close to half of all people with diabetes, are unaware of their disease. Most of these cases are type 2 diabetes. The earlier a person is diagnosed and management of diabetes begins, the better the chances of preventing harmful and costly complications. The need to diagnose and provide appropriate care to people with diabetes is therefore urgent.

Disparities by region

No country has diagnosed every person that has diabetes. In sub-Saharan Africa, where resources are often lacking and governments may not prioritise screening for diabetes, the proportion of people with diabetes who are undiagnosed is as high as 90% in some countries.¹ Even in high-income countries, about one-third of people with diabetes have not been diagnosed. The South-East Asia Region (35.1 million) and the Western Pacific Region (74.7 million) together account for over 60% of all people with undiagnosed diabetes. Globally, 84% of all people who are undiagnosed live in low- and middle-income countries.

Complications

A person with type 2 diabetes can live for several years without showing any symptoms. But during that time high blood glucose is silently damaging the body and diabetes complications may be developing. The complications associated with diabetes are so varied that even when symptoms do exist, diabetes may not be recognised as the cause unless accurate and appropriate testing is carried out. Those who are undiagnosed will not be taking steps to manage their blood glucose levels or lifestyle. Studies have found that many people with undiagnosed diabetes already have complications, such as chronic kidney disease and heart failure, retinopathy and neuropathy.²⁻⁴

Costs

The costs associated with diabetes include increased use of health services, productivity loss and disability, which can be a considerable burden to the individual, families and society. When people have long-standing undiagnosed diabetes, the potential benefits of early diagnosis and treatment are lost. Furthermore, the costs related to undiagnosed diabetes are considerable. One study from the USA found that undiagnosed diabetes was responsible for an additional USD 18 billion in healthcare costs in one year.⁵

Identifying people with diabetes

Opportunistic identification of people with risk factors for undiagnosed type 2 diabetes is feasible and cost-effective.⁶ Risk scores and 'tick tests' listing risk factors have been developed in many countries based on epidemiological surveys of the local populations, and are widely available. While undiagnosed diabetes is a substantial problem, population-wide screening for diabetes is not appropriate. Countries must first develop health systems that can meet the needs of people living with the disease. Priority should be given to providing good care and treatment to people already identified with diabetes. Targeted screening for those at high risk of undiagnosed diabetes may be considered once a working system for care is in place.

Estimating undiagnosed diabetes

Population-based studies provide the basis for estimating undiagnosed diabetes. A sample of people living in a particular area is tested for diabetes, which identifies both known and previously undiagnosed cases. The *IDF Diabetes Atlas* estimates undiagnosed diabetes using representative population-based studies reporting the proportion of previously undiagnosed cases. The findings from these studies are then combined by Region and income group to generate an estimate that is later applied to the prevalence estimates. Full details of the methods and results are available in the published paper at www.idf.org/diabetesatlas.

Map 2.3 Prevalence* (%) of undiagnosed diabetes (20-79 years), 2013

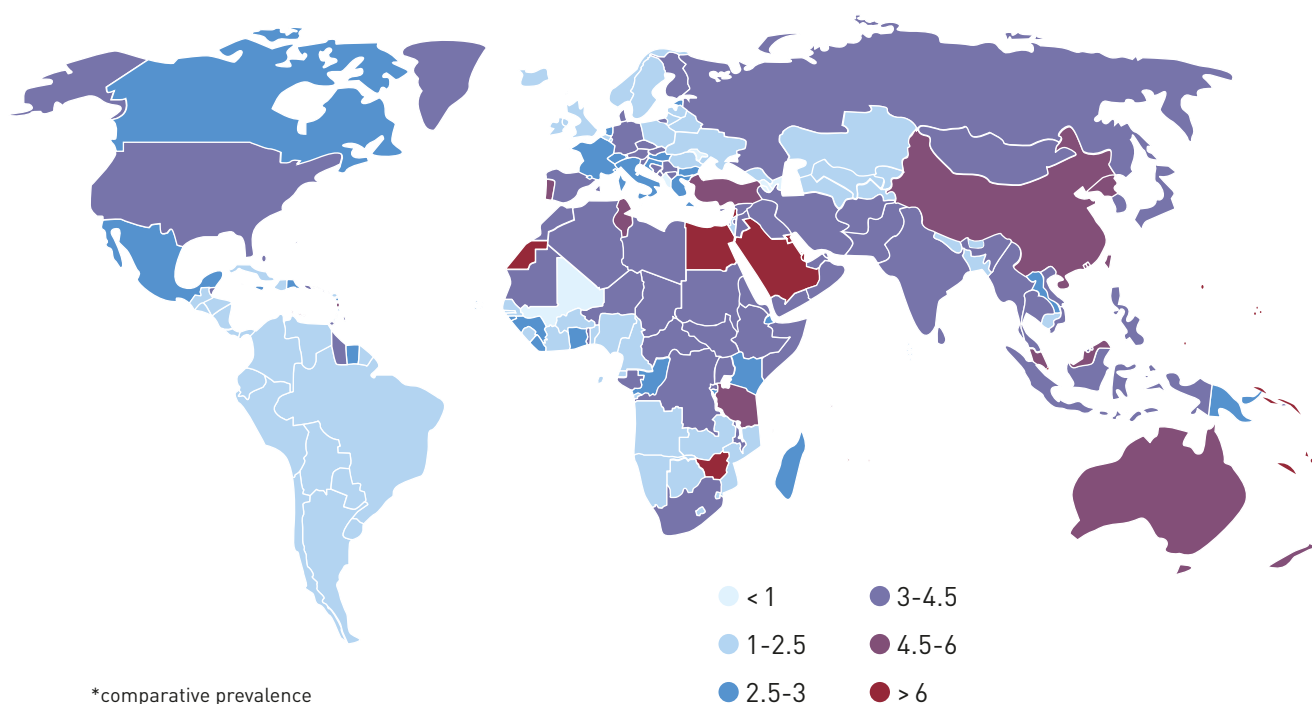


Table 2.3 Undiagnosed diabetes (20-79 years) by IDF Region and income group, 2013

IDF REGION	PROPORTION UNDIAGNOSED %	CASES MILLIONS
Africa		12.4
Low-income countries	75.1	
Middle-income countries	46.0	
Europe		20.1
Low-income countries	29.3	
Middle-income countries	35.1	
High-income countries	36.6	
Middle East and North Africa		16.8
Low-income countries	50.0	
Middle-income countries	50.0	
High-income countries	40.7	
North America and Caribbean		9.9
Low-income countries	29.4	
Middle-income countries	25.0	
High-income countries	27.7	
South and Central America		5.8
Middle-income countries	24.1	
South-East Asia		35.1
Low-income countries	43.6	
Middle-income countries	49.1	
Western Pacific		74.7
Low-income countries	63.0	
Middle-income countries	54.1	
High-income countries	49.4	

2.3 Impaired glucose tolerance

Impaired glucose tolerance (IGT), along with impaired fasting glucose (IFG), is recognised as being a stage preceding diabetes when blood glucose levels are higher than normal. Thus, people with IGT are at high risk of developing type 2 diabetes, although all people with IGT do not always go on to develop the disease. In more than one-third of people with IGT, blood glucose levels will return to normal over a period of several years.¹

Data on IGT are included in this report because IGT greatly increases the risk of developing type 2 diabetes¹ and it is linked with the development of cardiovascular disease.^{2,3} In addition, some of the best evidence on the prevention of type 2 diabetes comes from studies involving people with IGT.

Prevalence

Some 316 million people worldwide, or 6.9% of adults, are estimated to have IGT. The vast majority (70%) of these people live in low- and middle-income countries. By 2035, the number of people with IGT is projected to increase to 471 million, or 8.0% of the adult population.

Age distribution

The majority of adults with IGT are under the age of 50 (153 million) and, if left untreated, are at high risk of progressing to type 2 diabetes later in life. This age group will continue to have the highest number of people with IGT in 2035, rising to 198 million, as shown in Figure 2.3. It is important to note that nearly one-third of all those who currently have IGT are in the 20 to 39 year age group, and are therefore likely to spend many years at high risk – if indeed they do not go on to develop diabetes.

The prevalence of IGT is generally similar to that of diabetes, but somewhat higher in the Africa and Europe Regions and lower in the South-East Asia Region.

Figure 2.3 Number of people with IGT by age (20-79 years), 2013 and 2035

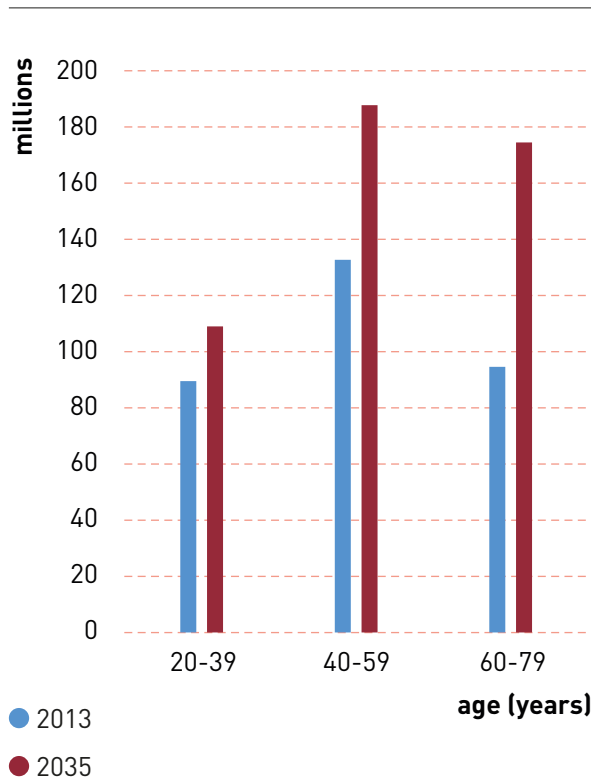


Figure 2.4 Prevalence (%) of IGT (20-79 years) by age and sex, 2013

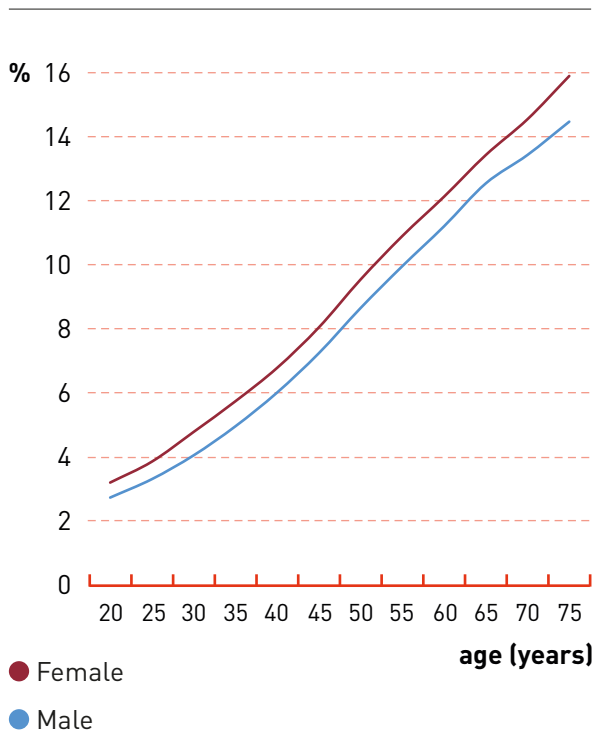
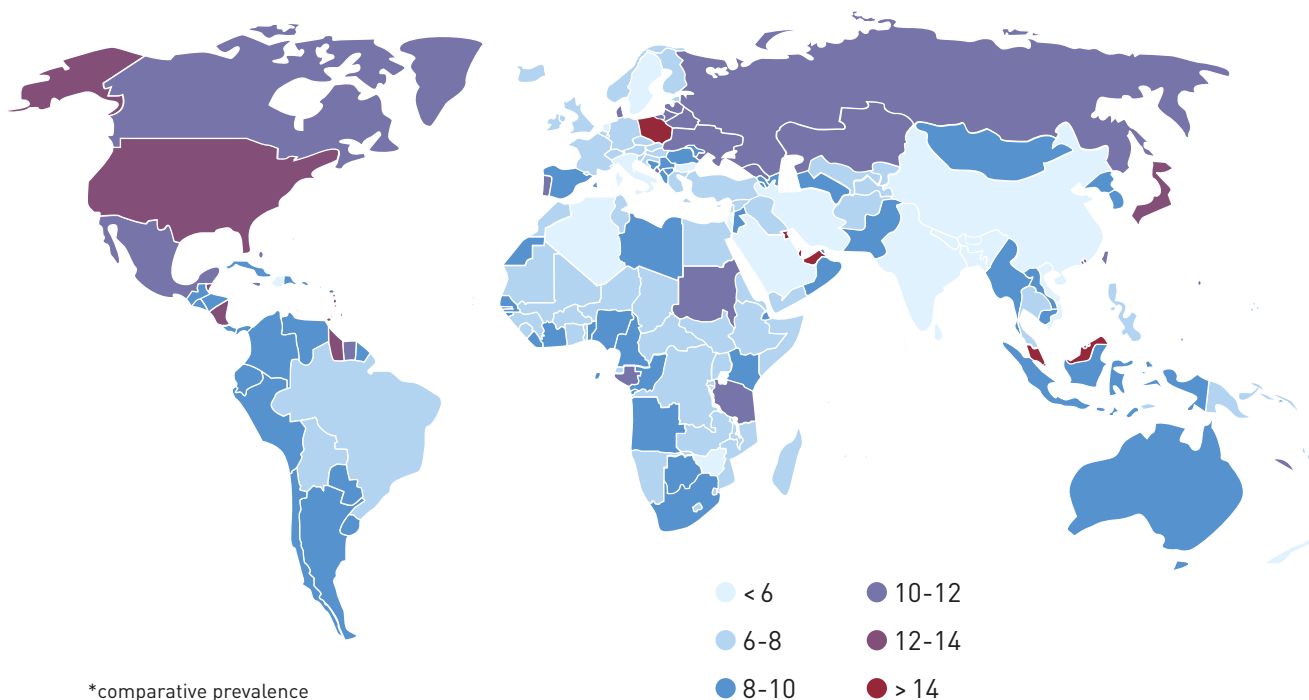


Table 2.4 Top 10 countries/territories for prevalence* (%) of IGT (20-79 years), 2013 and 2035

COUNTRY/ TERRITORY	2013 (%)	COUNTRY/ TERRITORY	2035 (%)
Kuwait	17.9	Poland	19.3
Qatar	17.1	Kuwait	18.1
United Arab Emirates	16.6	Qatar	17.4
Poland	16.5	United Arab Emirates	17.0
Bahrain	16.3	Bahrain	16.7
Malaysia	15.2	Malaysia	15.3
Hong Kong SAR	13.3	Hong Kong SAR	13.2
Nicaragua	12.9	Anguilla	13.0
Japan	12.6	Guadeloupe	13.0
Singapore	12.4	Macau SAR	12.9

*comparative prevalence

Map 2.4 Prevalence* (%) of impaired glucose tolerance (20-79 years), 2013



2.4 Diabetes in young people

Type 1 diabetes is one of the most common endocrine and metabolic conditions in childhood. The number of children developing this form of diabetes every year is increasing rapidly, especially among the youngest children. In a growing number of countries, type 2 diabetes is also being diagnosed in children.

The challenges

In type 1 diabetes, insulin therapy is life-saving and lifelong. A person with type 1 diabetes needs to follow a structured self-management plan, including insulin use and blood glucose monitoring, physical activity, and a healthy diet. In many countries, especially in low-income families, access to self-care tools, including self-management education, as well as to insulin, is limited. This leads to severe disability and early death in children with diabetes.

Many children and adolescents may find it difficult to cope emotionally with their disease. Diabetes can result in discrimination and may limit social relationships. It may also have an impact on a child's academic performance. The costs of treatment and monitoring equipment, combined with the daily needs of a child with diabetes, may place a serious financial and emotional burden on the whole family.

Incidence and prevalence

Three major collaborative projects, the Diabetes Mondiale study (DIAMOND),¹ the Europe and Diabetes study (EURODIAB),² and the SEARCH for Diabetes in Youth study³ have been instrumental in monitoring trends in incidence (the number of people developing a disease in a year). This has been done by setting up population-based regional or national registries using standardised definitions, data collection forms, and methods for validation.

The incidence of type 1 diabetes among children is increasing in many countries, particularly in children under the age of 15 years. There are strong indications of geographic differences in trends but the overall annual increase is estimated to be around 3%.^{1,2} Evidence shows that incidence is increasing more steeply in some Central and Eastern European countries, where the disease

is less common. Also, several European studies have suggested that, in relative terms, increases are greatest among younger children.

There is also evidence that similar trends exist in many other parts of the world, but in sub-Saharan Africa incidence data are limited or non-existent. Special efforts must be made to collect more data, especially in those countries where diagnoses may be missed.

Some 79,100 children under 15 years are estimated to develop type 1 diabetes annually worldwide. Of the estimated 497,100 children living with type 1 diabetes, 26% live in the Europe Region, where the most reliable and up-to-date estimates of incidence are available, and 22% in the North America and Caribbean Region.

Type 2 diabetes in young people

There is evidence that type 2 diabetes in children and adolescents is increasing in some countries. However, reliable data are sparse.⁴ As with type 1 diabetes, many children with type 2 diabetes risk developing complications in early adulthood, which would place a significant burden on the family and society. With increasing levels of obesity and physical inactivity among young people in many countries, type 2 diabetes in childhood has the potential to become a global public health issue leading to serious health outcomes. More information about this aspect of the diabetes epidemic is urgently needed.

AT A GLANCE

2013

Total child population (0-14 years, billions) **1.9**

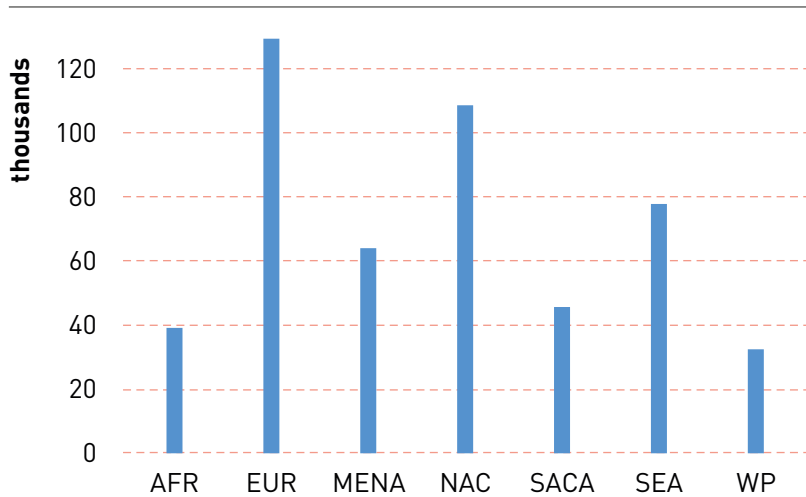
TYPE 1 DIABETES IN CHILDREN (0-14 YEARS)

Number of children with type 1 diabetes (thousands) **497.1**

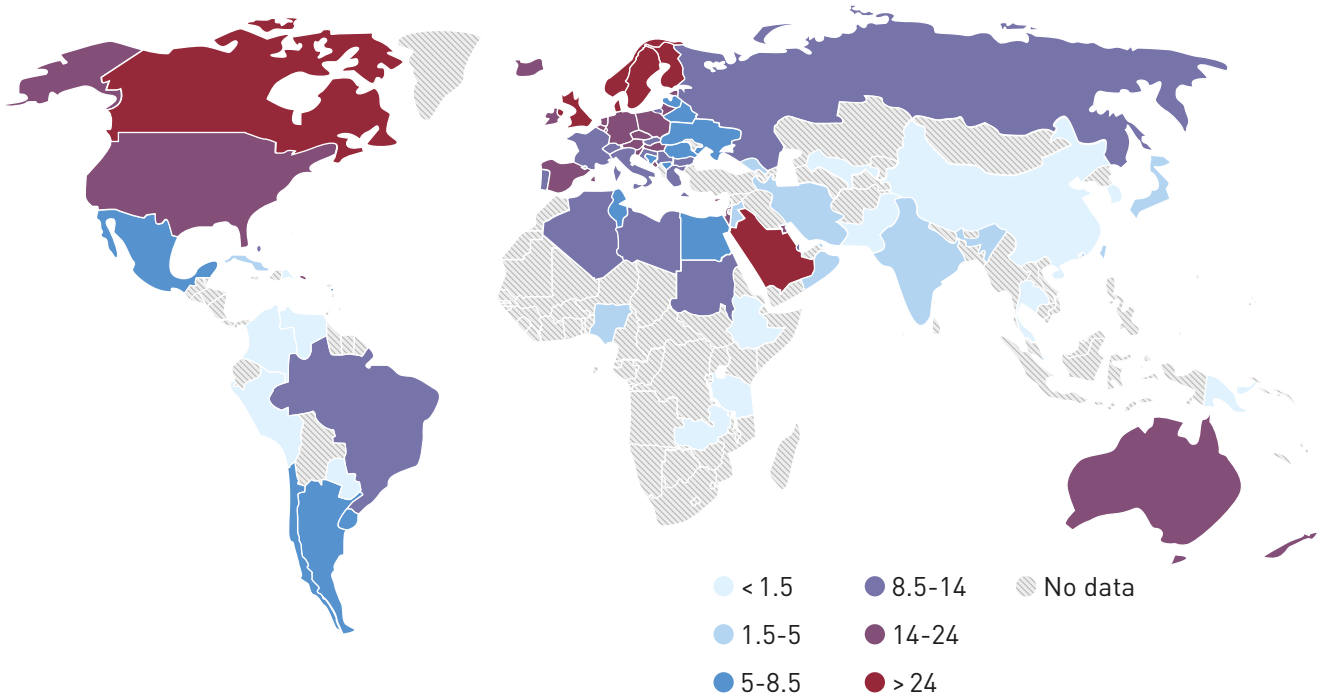
Number of children per year (thousands) **79.1**

Annual increase in incidence (%)^{1,2} **3**

Figure 2.5 Estimated number of children (0-14 years) with type 1 diabetes by IDF Region, 2013



Map 2.5 New cases of type 1 diabetes (0-14 years per 100,000 children per year), 2013



2.5 Hyperglycaemia in pregnancy

High blood glucose, or hyperglycaemia, is one of the most common health problems of pregnancy.¹ Hyperglycaemia in pregnancy can be a result of either previously existing diabetes in a pregnant woman, or the development of insulin resistance later in the pregnancy in a condition known as gestational diabetes. Unlike diabetes in pregnancy, gestational diabetes resolves once the pregnancy ends. Hyperglycaemia in pregnancy is categorised (see Box 6.1) as either diabetes in pregnancy or gestational diabetes, depending on blood glucose values obtained during screening.

Risks and complications

Any unmanaged hyperglycaemia in pregnancy can result in birth complications that can affect both mother and child including: increased risk of preeclampsia, obstructed labour due to fetal macrosomia and hypoglycaemia at birth for the infant.

As the prevalence of both obesity and diabetes in women of childbearing age continue to rise in all regions, so will the prevalence of hyperglycaemia in pregnancy. In addition, women who develop gestational diabetes have an increased lifetime risk of developing type 2 diabetes.² Babies born to mothers who have hyperglycaemia in pregnancy are also at an increased risk of developing type 2 diabetes later in life.

Prevalence

IDF estimates that 21.4 million or 16.8% of live births to women in 2013 had some form of hyperglycaemia in pregnancy. An estimated 16% of those cases were due to diabetes in pregnancy and would require careful monitoring during the pregnancy and follow-up post-partum.

There are some regional differences in the prevalence (%) of hyperglycaemia in pregnancy, with the South-East Asia Region having the highest prevalence at 25.0% compared to 10.4% in the North America and Caribbean Region. A staggering 91.6% of cases of hyperglycaemia in pregnancy were in low- and middle-income countries, where access to maternal care is often limited.

The prevalence of hyperglycaemia in pregnancy increases rapidly with age and is highest in women over the age of 45 (47.7%), although there are fewer pregnancies in that age group. This explains why just 23% of global cases of hyperglycaemia in pregnancy occurred in women over the age of 35, even though the risk of developing the condition is higher in these women.

Estimating prevalence

There is great diversity in the methods and criteria used for identifying women with hyperglycaemia in pregnancy, which increases the difficulty of making comparisons between studies and generating estimates on prevalence.² However, the recent publication of a guideline from the World Health Organization on diagnosing hyperglycaemia in pregnancy will contribute to a standard approach to estimating prevalence.³

Data on hyperglycaemia in pregnancy from studies were available for 34 countries across all IDF Regions. Although each of the Regions was represented, the majority of the studies were carried out in high-income countries. More information is available on the methods used to generate the estimates at www.idf.org/diabetesatlas.

AT A GLANCE

2013

Total live births (20-49 years, millions) **127.1**

HYPERGLYCAEMIA IN PREGNANCY IN WOMEN (20-49 YEARS)

Global prevalence (%) **16.9**

Comparative prevalence (%) **14.8**

Number of live births with hyperglycaemia in pregnancy (millions) **21.4**

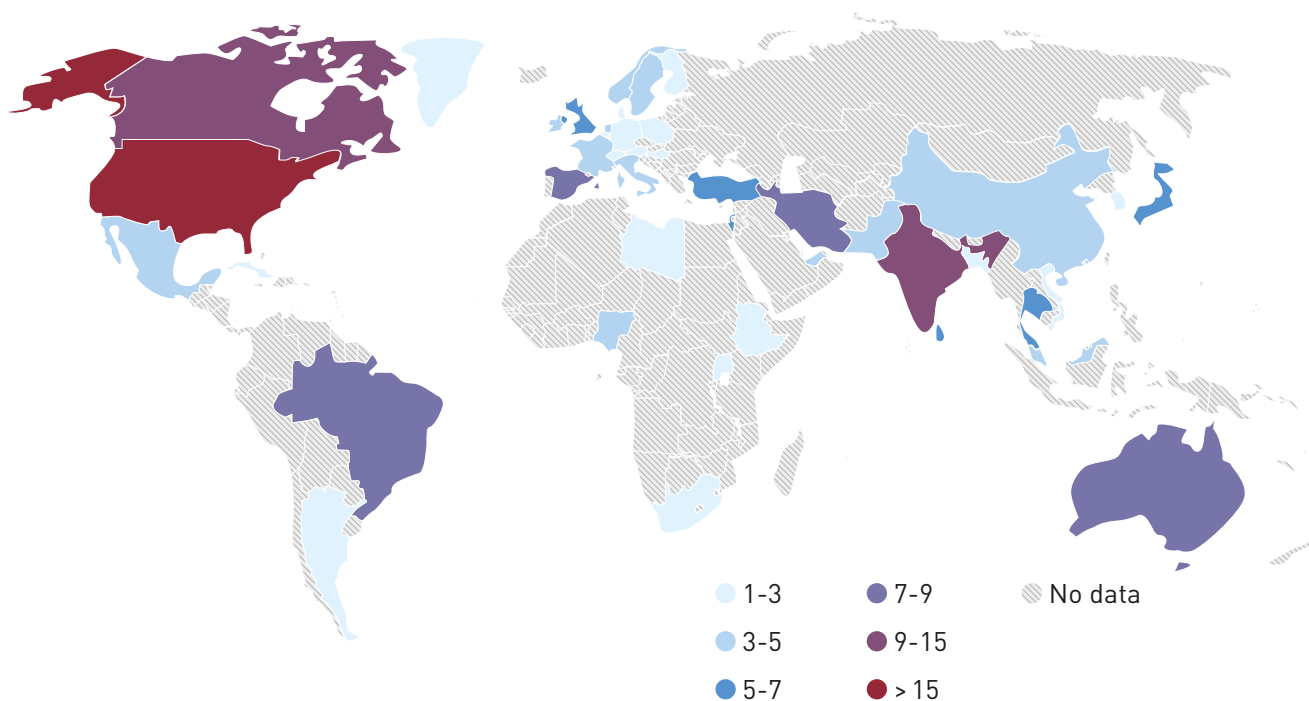
Proportion of cases that may be due to diabetes in pregnancy (%) **16.0**

Table 2.5 Hyperglycaemia in pregnancy (20-49 years) by IDF Region, 2013

IDF REGION	Cases in live births MILLIONS	Prevalence* %	Proportion of cases that may be due to diabetes in pregnancy %
AFR	4.6	14.4	19.6
EUR	1.7	12.6	10.9
MENA	3.4	17.5	17.7
NAC	0.9	10.4	24.9
SACA	0.9	11.4	17.3
SEA	6.3	25.0	9.5
WP	3.7	11.9	14.1

*comparative prevalence

Map 2.6 Data sources providing information on prevalence of hyperglycaemia in pregnancy, 2013



2.6 Mortality

Diabetes and its complications are major causes of early death in most countries. Cardiovascular disease (see Chapter 1) is one of the leading causes of death among people with diabetes. It can account for 50% or more of deaths due to diabetes in some populations. Estimating the number of deaths due to diabetes is challenging because on the one hand, more than a third of countries do not have any data on diabetes-related mortality; and on the other, because existing routine health statistics underestimate the number of deaths due to diabetes. To provide a more realistic estimate of mortality, the *IDF Diabetes Atlas* uses a modelling approach to estimate the number of deaths that can be attributed to diabetes.¹

Burden of mortality

Approximately 5.1 million people aged between 20 and 79 years died from diabetes in 2013, accounting for 8.4% of global all-cause mortality among people in this age group. This estimated number of deaths is similar in magnitude to the combined deaths from several infectious diseases that are major public health priorities,* and is equivalent to one death every six seconds. Close to half (48%) of deaths due to diabetes are in people under the age of 60. The highest number of deaths due to diabetes occurred in countries with the largest numbers of people with the disease: China, India, USA, and the Russian Federation.

Gender distribution

There is very little difference between men and women in the total number of deaths due to diabetes. However, there are important differences in the distribution of these deaths.

In all but the Middle East and North Africa, and Western Pacific Regions, diabetes accounts for a higher proportion of deaths in women than in men, representing up to a quarter of all deaths in middle-aged women. This disparity is likely to be due to higher rates of mortality in men from other causes.

Trends

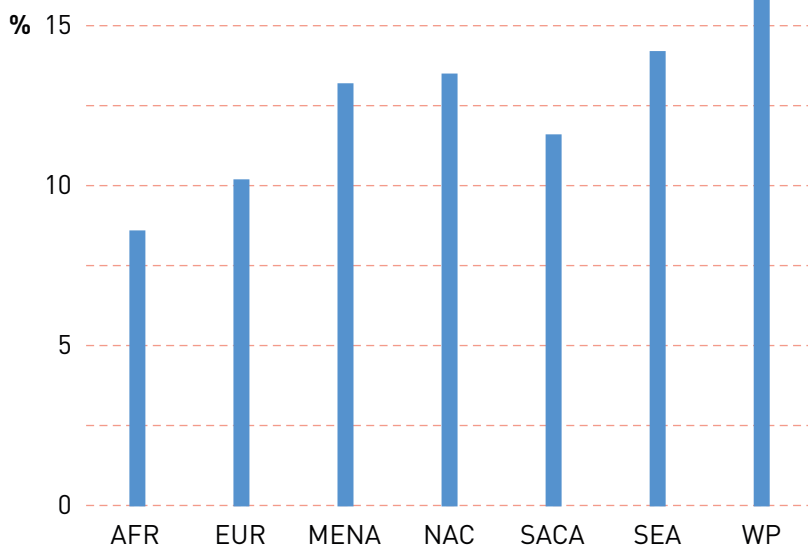
The number of deaths attributable to diabetes in 2013 showed an 11% increase over estimates for 2011.^{1,2} This increase was largely due to rises in the number of deaths due to the disease in the Africa, Western Pacific, and Middle East and North Africa Regions. This can be explained in part by a rise in diabetes prevalence in some highly populated countries in each Region. While there has been a documented decline in mortality from some NCDs in some countries,³ no such decline has been reported for diabetes.

Accuracy of mortality data

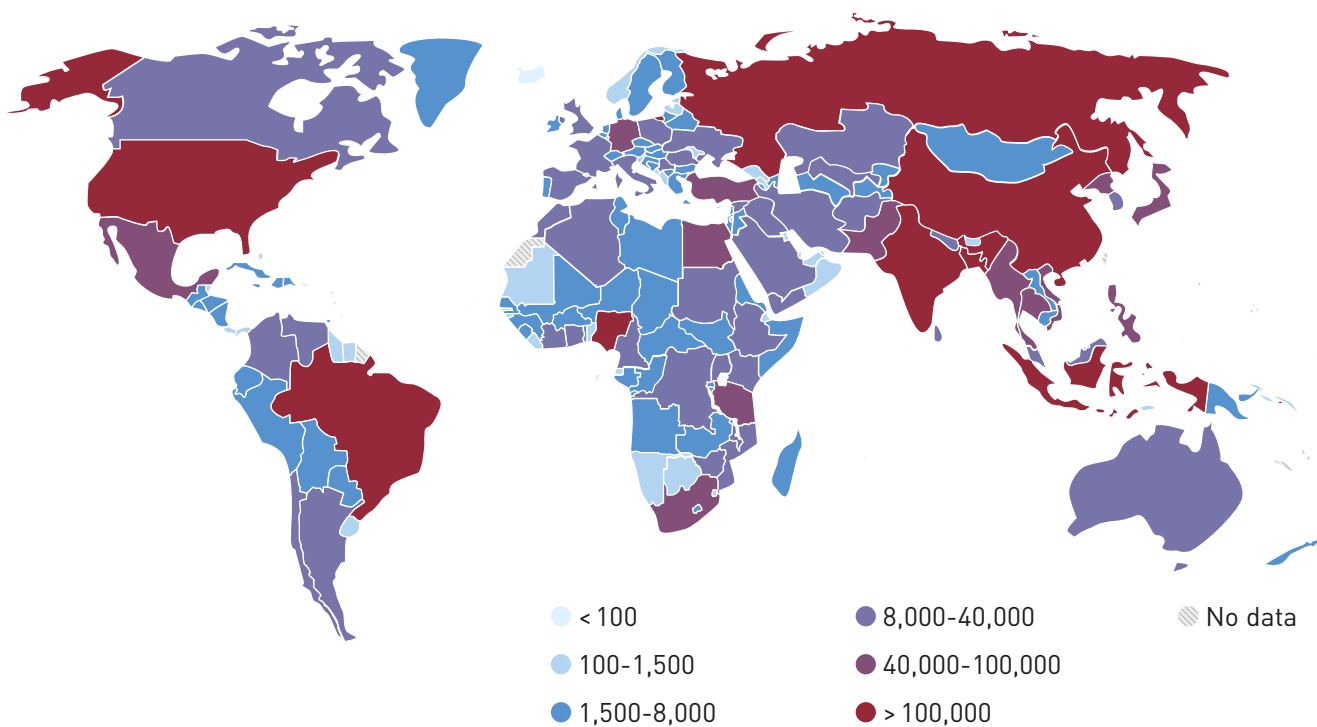
The mortality estimates should be interpreted with caution. However, they are probably more realistic than estimates based on routine sources of health statistics, which consistently underestimate the burden of mortality from diabetes largely because diabetes is often omitted from death certificates as the cause of death. A substantial proportion of these deaths are potentially avoidable through public health action directed at population-based prevention of diabetes and its complications and improvements in care for all people with diabetes.⁴

* In 2009 there were 1.8 million deaths from HIV/AIDS,⁵ 781,000 from malaria⁶ and 1.3 million from tuberculosis.⁷

Figure 2.6 Deaths attributable to diabetes as a percentage of all deaths (20-79 years) by IDF Region, 2013



Map 2.7 Deaths attributable to diabetes (20-79 years), 2013



2.7 Health expenditure

Diabetes imposes a large economic burden on individuals and families, national health systems, and countries. Health spending on diabetes accounted for 10.8% of total health expenditure worldwide in 2013. About 90% of the countries covered in this report dedicated between 5% and 18% of their total health expenditure to diabetes. Health expenditure includes medical spending on diabetes by health systems, as well as by people living with diabetes and their families.

Global health expenditure

Global health spending to treat diabetes and manage complications totalled at least USD 548 billion in 2013. By 2035, this number is projected to exceed USD 627 billion. Expressed in International Dollars (ID), which correct for differences in purchasing power, global health spending on diabetes was estimated to be at least ID 581 billion in 2013 and ID 678 billion in 2035. An estimated average of USD 1,437 (ID 1,522) per person with diabetes was spent globally on treating and managing the disease in 2013.

Health spending due to diabetes is not evenly distributed across age groups. The estimates show that 76% of global health expenditure on diabetes in 2013 was for people between the ages of 50 and 79 years.

Disparities in health spending

There is a large disparity in health spending on diabetes between regions and countries. Only 20% of global health expenditure on diabetes was made in low- and middle-income countries, where 80% of people with diabetes live. On average, the estimated health spending due to diabetes was USD 5,621 (ID 5,305) per person with diabetes in high-income countries, compared to USD 356 (ID 545) in low- and middle-income countries.

The USA spent USD 239 billion of its health dollars on diabetes, or 36% of global health expenditure. Meanwhile, China, the country with the most people living with diabetes, spent just USD 38 billion, less than 7% of the global total. The combined spending of the top three countries, the USA, Germany and China, was equivalent to more than half of all global health expenditure on diabetes in 2013. Norway spent an average of USD 10,368 on diabetes healthcare per person with diabetes, while countries such as Somalia and Eritrea spent less than USD 30.

Economic burden

Compared with those living in high-income countries, people living in low- and middle-income countries pay a larger share of health expenditure because they lack access to health insurance and publicly available medical services. In Latin America, for instance, families pay between 40% and 60% of medical expenses from their own pockets.¹ In some of the poorest countries, people with diabetes and their families bear almost the total cost of medical care.

Implementing inexpensive, easy-to-use interventions can reduce the huge economic burden of diabetes. Many of these interventions are cost-effective and/or cost saving, even in developing countries.² Nonetheless, these interventions are not widely used.

Map 2.8 Mean diabetes-related health expenditure per person with diabetes (20-79 years) (USD), R=2*, 2013

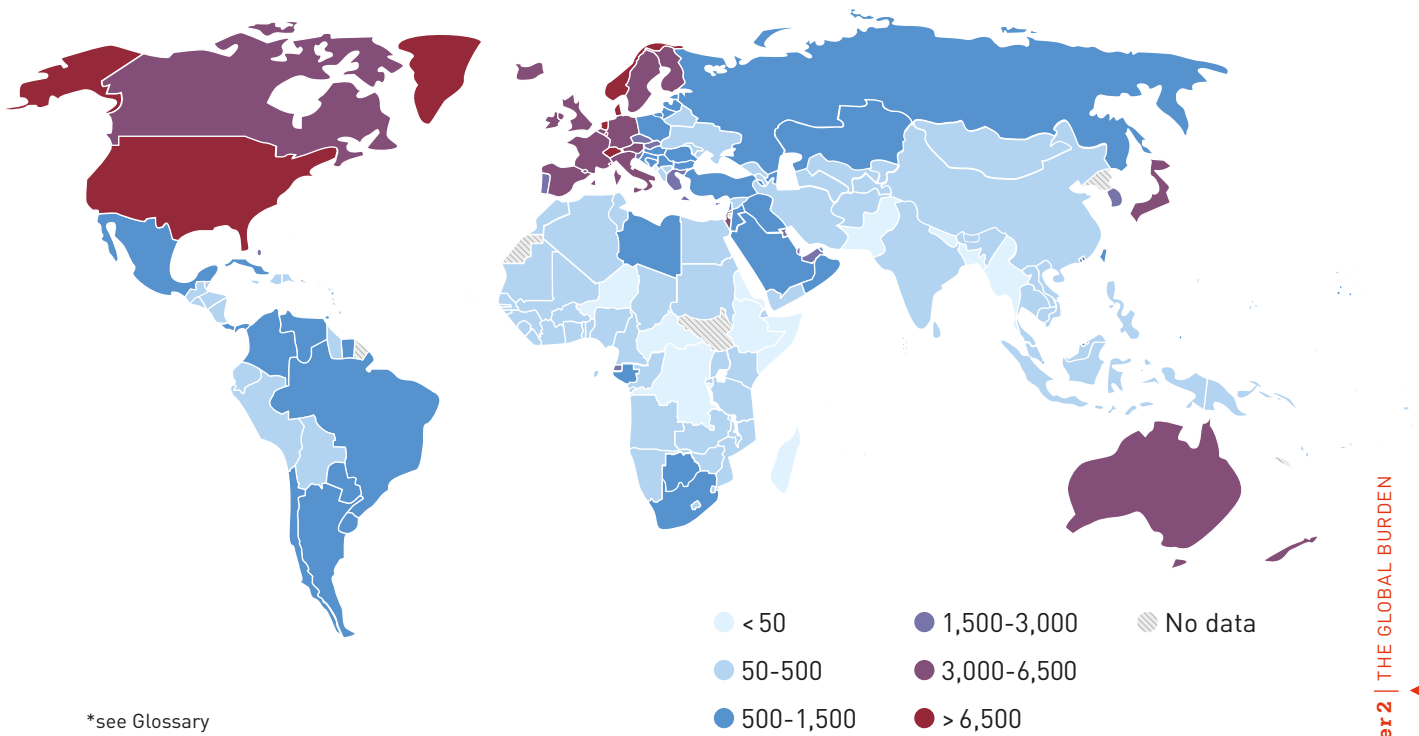
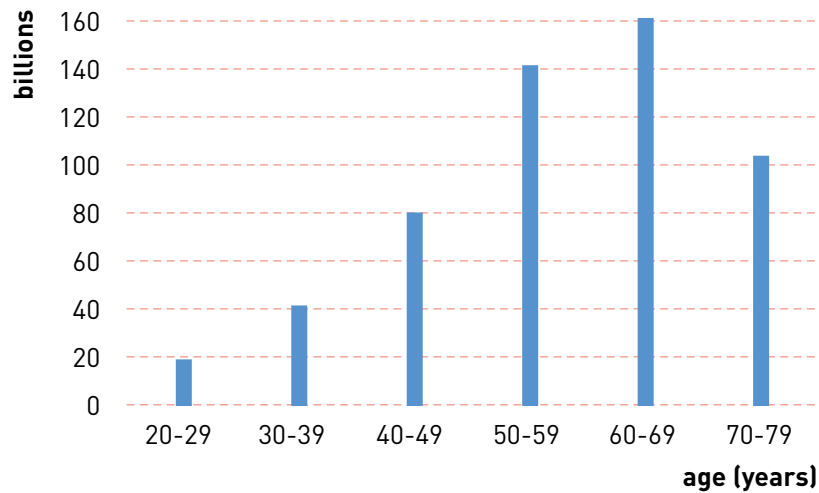


Figure 2.7 Health expenditure due to diabetes by age (USD, R=2), 2013








Regional overviews



i/10


**In the Middle East
and North Africa,
1 in 10 adults
has diabetes**



**In South-East Asia,
half of people with
diabetes are
undiagnosed**



**\$
\$
\$**



**More was spent on
healthcare for diabetes
in the North America and
Caribbean than in any
other region**

Europe has the highest prevalence of **CHILDREN** with type 1 diabetes



In Africa, 76% of deaths due to diabetes were in **people under the age of 60**

In the Western Pacific, **138 million** adults have diabetes – the largest number of any region

3

Regional overviews

A global perspective

The majority of people with diabetes live in the economically less-developed regions of the world. Even in Africa, the Region with the lowest prevalence, it is estimated that around 522,600 people died due to diabetes in 2013. The disparities in the world's response to the epidemic are huge: although 80% of people with diabetes live in low- and middle-income countries, only 20% of global health expenditure on the disease was made in those countries.

A global perspective of the epidemic is essential to understand the true dimensions of the diabetes burden and its consequences. This chapter presents an overview of each of the seven IDF Regions: Africa (AFR), Europe (EUR), the Middle East and North Africa (MENA), North America and Caribbean (NAC), South and Central America (SACA), South-East Asia (SEA), and the Western Pacific (WP). Each Region is highly diverse in socioeconomic and geographical terms and in diabetes prevalence, related deaths, and health expenditure.

Prevalence of diabetes and impaired glucose tolerance

A staggering 138 million people are living with diabetes in the Western Pacific, more than in any other IDF Region. With 19.8 million people affected, Africa has the smallest diabetes popu-

lation compared with the other Regions although this is projected to more than double by 2035. In terms of the prevalence of adults with diabetes, the Middle East and North Africa Region has the highest, at 10.9%. MENA is followed closely by the 9.6% rate found in the North America and Caribbean Region while 8.2% of adults in the South and Central America Region have diabetes (Table 3.0).

The picture is similar for IGT. The Western Pacific Region is estimated to have the greatest number of people with IGT and consequently at greatly increased risk for developing type 2 diabetes, with some 110 million; although the North America and Caribbean Region has the highest comparative prevalence, with 12.1% of the adult population affected. Worldwide, the prevalence (%) of IGT is lower than that of diabetes but there is a high risk that, if not treated early, these people will progress to diabetes.

Deaths due to diabetes

Mortality attributable to diabetes ranges from 8.6% of all deaths in adults aged between 20 and 79 in the Africa Region to almost 15.8% in the Western Pacific Region. Almost half of all deaths due to diabetes occurred in people under the age of 60. Diabetes is a major cause of death worldwide; investment in reducing this burden is justified and necessary.

Health expenditure

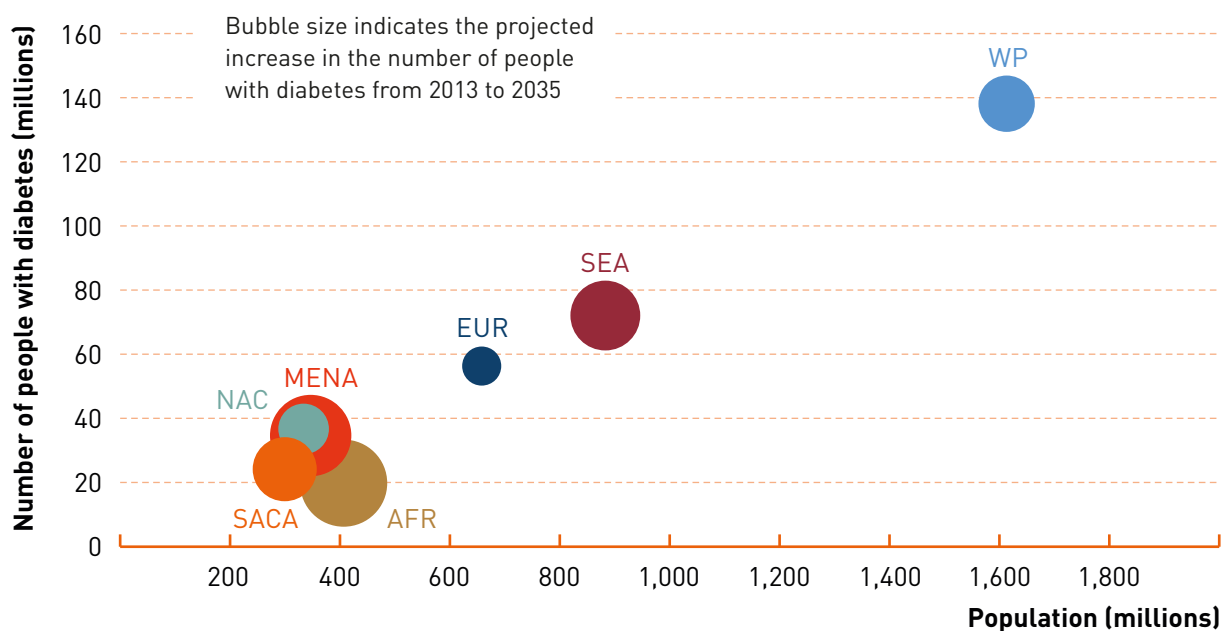
The disparities between the Regions can be seen clearly in healthcare spending on diabetes. The North America and Caribbean Region spent an estimated USD 263 billion – 48% of global health expenditure on diabetes. Europe spent USD 147 billion. The spending of each of these Regions on diabetes healthcare was greater than that of the other Regions combined. The Western

Pacific Region spent only USD 88 billion, despite having the largest number of people with diabetes. The South and Central America, and Middle East and North Africa Regions each dedicated to diabetes less than 5% of global diabetes health expenditure, while the South-East Asia and Africa Regions spent less than 1%.

Table 3.0 Regional estimates for diabetes (20-79 years), 2013 and 2035

IDF REGION	2013			2035			Increase in the number of people with diabetes
	Population MILLIONS	Number of people with diabetes MILLIONS	Comparative diabetes prevalence %	Population MILLIONS	Number of people with diabetes MILLIONS	Comparative diabetes prevalence %	
AFR	407.9	19.8	5.7	775.5	41.5	6.0	109.6
EUR	658.7	56.3	6.8	668.7	68.9	7.1	22.4
MENA	374.5	34.6	10.9	583.7	67.9	11.3	96.2
NAC	334.9	36.8	9.6	404.5	50.4	9.9	37.3
SACA	300.5	24.1	8.2	394.2	38.5	8.2	59.8
SEA	883.2	72.1	8.7	1,216.9	123.0	9.4	70.6
WP	1,613.2	138.2	8.1	1,818.2	201.8	8.4	46.0
World	4,572.9	381.8	8.3	5,861.8	591.9	8.8	55.0

Figure 3.0 Number of people with diabetes by population (20-79 years) by IDF Region, 2013



3.1 Africa

For generations, the healthcare agenda in sub-Saharan Africa has been dominated by poverty and infectious disease, such as malaria and HIV/AIDS. With the transformation in lifestyles in both the sprawling urban centres and, increasingly, in rural areas, obesity and diabetes have become a new priority for health in the region. Nowadays, age-specific prevalence estimates of diabetes in African towns and cities often meet or exceed those found in high-income countries. As urbanisation increases and populations grow older, type 2 diabetes will continue to pose an ever-greater threat. The Africa Region, for instance, has the highest proportion of undiagnosed diabetes – at least 63%; an estimated 522,600 people in the Region died from diabetes-related causes in 2013. This represents 8.6% of deaths from all causes in adults. Investment, research and health systems are slow to respond to this burden and remain focused primarily on infectious diseases. The Africa Region accounts for less than 1% of global health expenditure on diabetes.

Prevalence

Currently, an estimated 19.8 million adults in the Africa Region have diabetes – a regional prevalence of 4.9%. The ranges of prevalence (%) figures between countries reflect the rapid socioeconomic and demographic transitions faced by communities throughout the Region. The highest prevalence of diabetes in the Africa Region is on the island of Réunion (15.4%), followed by Seychelles (12.1%), Gabon (10.7%) and Zimbabwe (9.7%). Some of Africa's most populous countries have the highest numbers of people with diabetes, including: Nigeria (3.9 million), South Africa (2.6 million), Ethiopia (1.9 million), and the United Republic of Tanzania (1.7 million). More than half of all people with diabetes in the Region live in just four of these high-population countries.

Children with type 1 diabetes in the Region often go undiagnosed. Even if they receive a timely diagnosis, few have the means to obtain insulin, syringes and monitoring equipment, and as a result, they die. These preventable early deaths are a key factor in the low prevalence of type 1 diabetes in the Region.

Mortality

Although only 8.6% of all deaths in the Africa Region can be attributed to diabetes, in 2013 a staggering 76.4% of those deaths occurred in people under the age of 60. Furthermore, there were more than 50% more deaths from diabetes in women compared to men. This is in part because men are more likely to die from other causes, such as armed conflict, and because in many cases women have poor access to healthcare.

Health expenditure

According to estimates for the Africa Region, at least USD 4 billion was spent on diabetes healthcare in 2013, and this spending is expected to increase around 58% by 2035. In the same period, the prevalence of diabetes is projected to almost double. With its health expenditure on diabetes the lowest of any of the IDF Regions, a two-fold increase in diabetes prevalence without a corresponding increase in spending will almost certainly have a very negative impact on rates of complications and death for people with diabetes in Africa.

Data sources

The number of data sources examining the prevalence of diabetes in adults in the Region has increased substantially in recent years. For this edition of the *IDF Diabetes Atlas*, 69 sources from 29 countries were considered, and a total of 21 sources from 19 countries were selected. However, data to estimate the numbers of children with type 1 diabetes remain very scarce. There is an urgent need for further epidemiological research and improved data collection systems in the Region. This is partly reflected in the high proportion of diabetes that is undiagnosed and found only at screening.

Map 3.1 Prevalence* (%) estimates of diabetes (20-79 years), 2013

AFRICA REGION

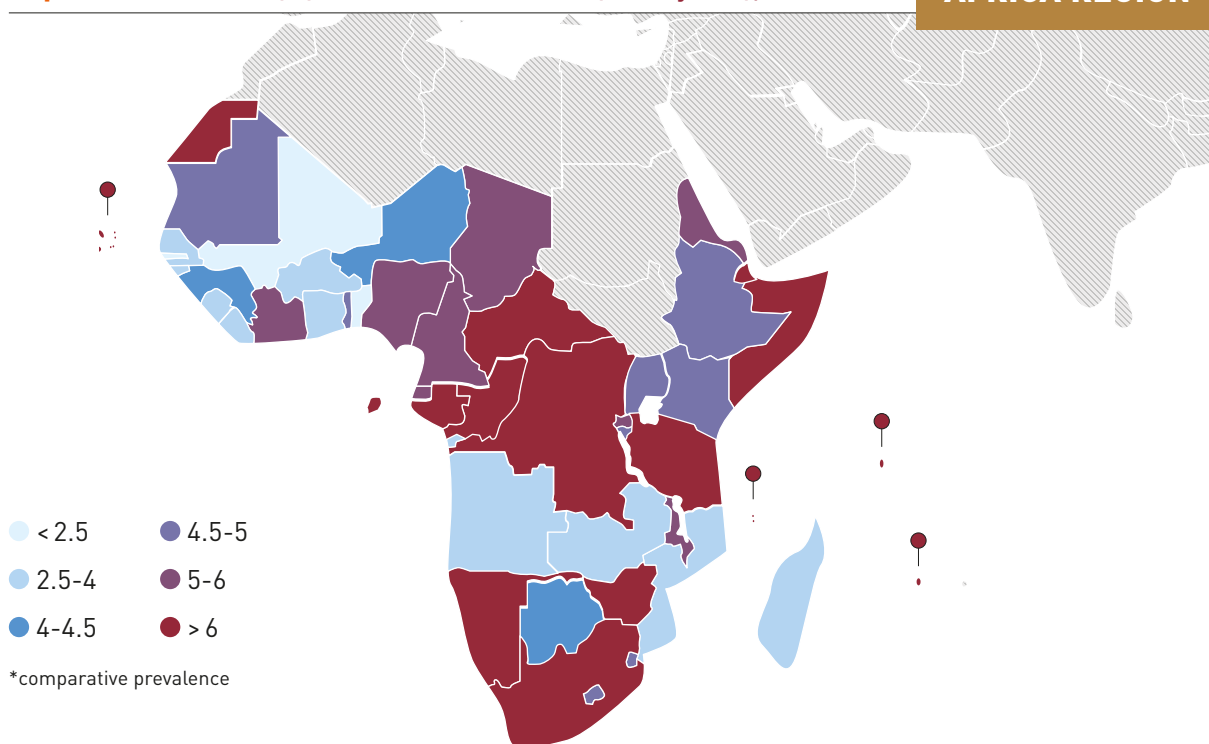
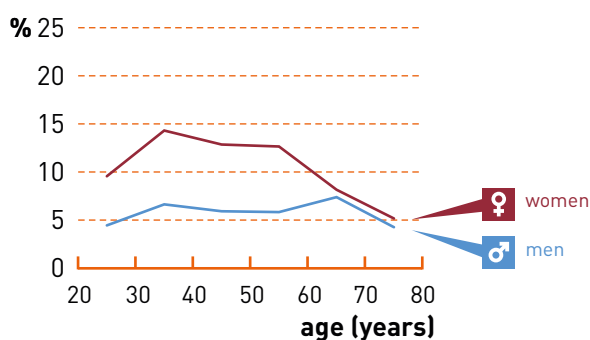
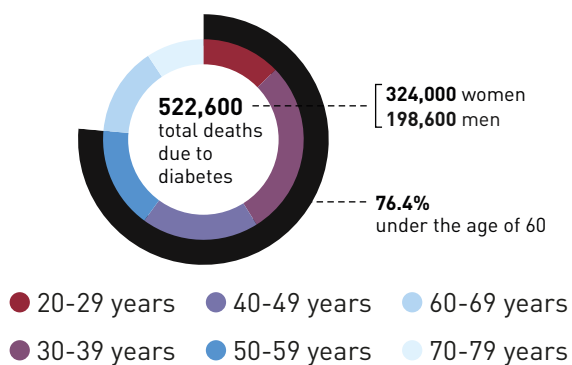


Figure 3.1 Mortality due to diabetes, Africa Region, 2013

Percentage of all-cause mortality due to diabetes by age (20-79 years) and sex:



Deaths due to diabetes by age:



AT A GLANCE

	2013	2035
Total population (millions)	888	1,511
Adult population (20-79 years, millions)	408	776

DIABETES (20-79 YEARS)

Regional prevalence (%)	4.8	5.3
Comparative prevalence (%)*	5.7	6.0
Number of people with diabetes (millions)	19.8	41.5

IGT (20-79 YEARS)

Regional prevalence (%)	7.3	8.5
Comparative prevalence (%)*	8.3	9.3
Number of people with IGT (millions)	29.7	66.0

TYPE 1 DIABETES (0-14 YEARS)

Number of children with type 1 diabetes (thousands)	39.1	-
Number of newly diagnosed cases per year (thousands)	6.4	-

HEALTH EXPENDITURE DUE TO DIABETES (20-79 YEARS, USD)

Total health expenditure, R=2*, (billions)	4.0	6.4
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*see Glossary

3.2 Europe

The 56 countries and territories in the Europe Region comprise diverse populations with different levels of affluence. Gross domestic product (GDP) varies from more than USD 89,000 per capita in Liechtenstein to less than USD 8,500 in several Eastern European countries.¹

The ageing of the population in the Region will place increasing numbers of people at risk of diabetes, and consequently, place a greater cost burden on health systems.

Prevalence

The number of people with diabetes in this vast Region is estimated to be 56.3 million – 8.5% of the adult population. Turkey has the highest prevalence (14.8%) and the Russian Federation has the greatest number of people with diabetes (10.9 million). By contrast, Azerbaijan has an estimated prevalence of diabetes of just 2.4%. After Turkey, the countries with the highest prevalence are Montenegro (10.1%), Macedonia (10.0%), Serbia (9.9%), and Bosnia and Herzegovina (9.7%). The countries with the highest number of people with diabetes are for the most part in Western Europe, including Germany, Spain, Italy, France, and the UK.

Age is an important risk factor for type 2 diabetes. In the Europe Region, 37% of the population are over 50 years of age, and this is expected to increase to over 44% by 2035. To a large degree, the high prevalence of type 2 diabetes and IGT are a consequence of the ageing of the Region's population.

Europe has the highest number of children with type 1 diabetes compared to the other IDF Regions – approximately 129,300. The Region also has one of the highest incidence rates of type 1 diabetes in children, with 20,000 new cases per year. The countries making the largest contribution to the overall numbers in type 1 diabetes in young people are the UK, the Russian Federation, and Germany.

Mortality

One in 10 deaths in adults in the Europe Region can be attributed to diabetes – 619,000 in 2013. The large majority (90%) of these deaths were in people over the age of 50, which partly reflects the age distribution of the population, but also may be related to improved survival rates due to more responsive health systems. There are slightly more deaths due to diabetes in women compared to men (329,000 vs 289,000, respectively) in the Region.

Health expenditure

Estimates indicate that at least USD 147 billion was spent on diabetes healthcare in the Europe Region in 2013, accounting for over one-quarter of global healthcare spending on diabetes. Just as there are wide variations in the prevalence of diabetes across the Region, the range between countries of average diabetes-related healthcare spending is also large – from USD 10,368 per person with diabetes in Norway to just USD 87 per person with diabetes in Tajikistan.

Data sources

A total of 49 sources in 35 of the 56 countries was used to generate estimates for diabetes in adults in the Region; and 16 for estimates of IGT. Surprisingly, there is a lack of population-based data using fasting blood glucose or oral glucose tolerance test for screening in many of the more affluent countries in the Region, despite these being some of the wealthiest in the world. The Region has by far the most complete and reliable data for type 1 diabetes in children. A large proportion of countries have registries that are either nationwide or cover several different parts of a country.

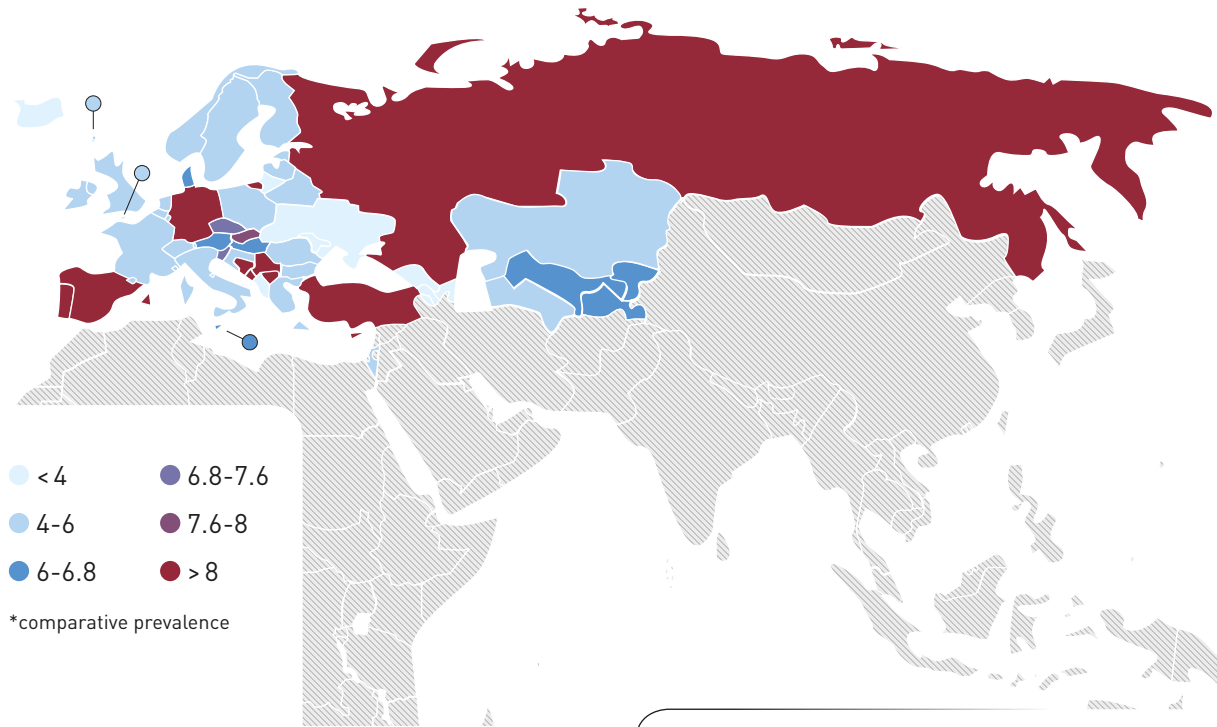
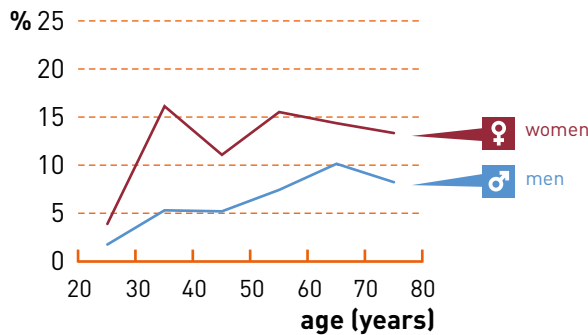
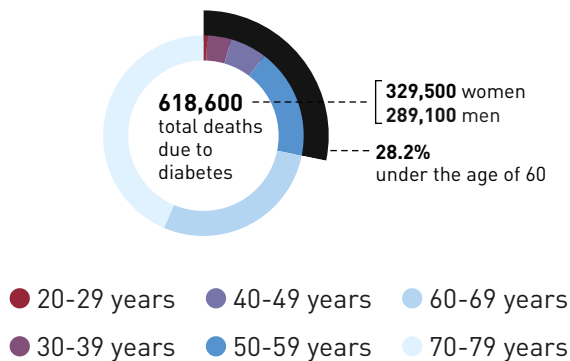


Figure 3.2 Mortality due to diabetes, Europe Region, 2013

Percentage of all-cause mortality due to diabetes by age (20-79 years) and sex:



Deaths due to diabetes by age:



AT A GLANCE

	2013	2035
Total population (millions)	907	928
Adult population (20-79 years, millions)	659	669

DIABETES (20-79 YEARS)

Regional prevalence (%)	8.5	10.3
Comparative prevalence (%)*	6.8	7.1
Number of people with diabetes (millions)	56.3	68.9

IGT (20-79 YEARS)

Regional prevalence (%)	9.2	11.0
Comparative prevalence (%)*	8.1	8.9
Number of people with IGT (millions)	60.6	73.7

TYPE 1 DIABETES (0-14 YEARS)

Number of children with type 1 diabetes (thousands)	129.4	-
Number of newly diagnosed cases per year (thousands)	20.0	-

HEALTH EXPENDITURE DUE TO DIABETES (20-79 YEARS, USD)

Total health expenditure, R=2*, (billions)	147.2	158.6
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*see Glossary

3.3 Middle East and North Africa

Three of the world's top 10 countries with the highest prevalence (%) of diabetes are in the Middle East and North Africa Region: Saudi Arabia, Kuwait, and Qatar. The Region has the highest comparative prevalence of diabetes (10.9%). Rapid economic development coupled with ageing populations has resulted in a dramatic increase in the prevalence of type 2 diabetes.

Over the past three decades, major social and economic changes have transformed many of the countries in the Region. These include rapid urbanisation, reduced infant mortality and increasing life expectancy. This dramatic development, especially among the very wealthy Gulf States, has brought with it a constellation of negative behavioural and lifestyle changes relating to poor-quality nutrition and reduced physical activity, giving rise to increased obesity. Smoking, a risk factor for diabetes complications, remains a serious and growing problem.^{1,2}

Prevalence

According to the latest estimates, 34.6 million people, or 9.2% of the adult population, have diabetes. This number is set to almost double to 67.9 million by 2035. The explosion of diabetes in the Region is overwhelmingly due to type 2 diabetes. Worryingly, the prevalence (%) in the Region among younger age groups is substantially higher than the global average. A further 25.2 million people, or 6.7% of the population, are estimated to have IGT and therefore are at high risk of developing diabetes. This number is also expected to almost double by 2035.

Saudi Arabia has 14,900 children with type 1 diabetes, by far the highest number in the Region, and approximately a quarter of the Region's total of 64,000.

Mortality

Diabetes kills more than 10% of all adults in the Region – 368,000 deaths in 2013, unevenly split between men (146,000) and women (222,000). Nearly half of all deaths from diabetes in the Region occurred in people under 60. These early deaths may be a result of a combination of factors: the rapidly changing environments and lifestyles in the Region, late diagnoses, and health systems that are not equipped to bear the growing burden.

Health expenditure

Despite the soaring estimates of diabetes prevalence throughout the Region, a total of only USD 13.6 billion was spent on diabetes health-care in 2013. Health expenditure on diabetes in the Region accounted for just 2.5% of global spending on the disease. This is expected to almost double by 2035 but is likely not to be enough to curb the rapid pace of the epidemic.

Data sources

A total of 28 sources from 13 countries were used to estimate diabetes prevalence in adults in the Region. Reliable data for type 1 diabetes in children were also available in a number of countries. The Middle East and North Africa Region poses a particular challenge for estimating diabetes prevalence because a large proportion of the resident population in many countries is made up of migrants. As a result, studies that include only nationals can make only a limited contribution to the overall picture of diabetes for the whole country. However, it is important to consider that for many of these countries, diabetes prevalence (%) is even higher among nationals than for the country as a whole.

Map 3.3 Prevalence* (%) estimates of diabetes (20-79 years), 2013

MIDDLE EAST AND NORTH AFRICA REGION

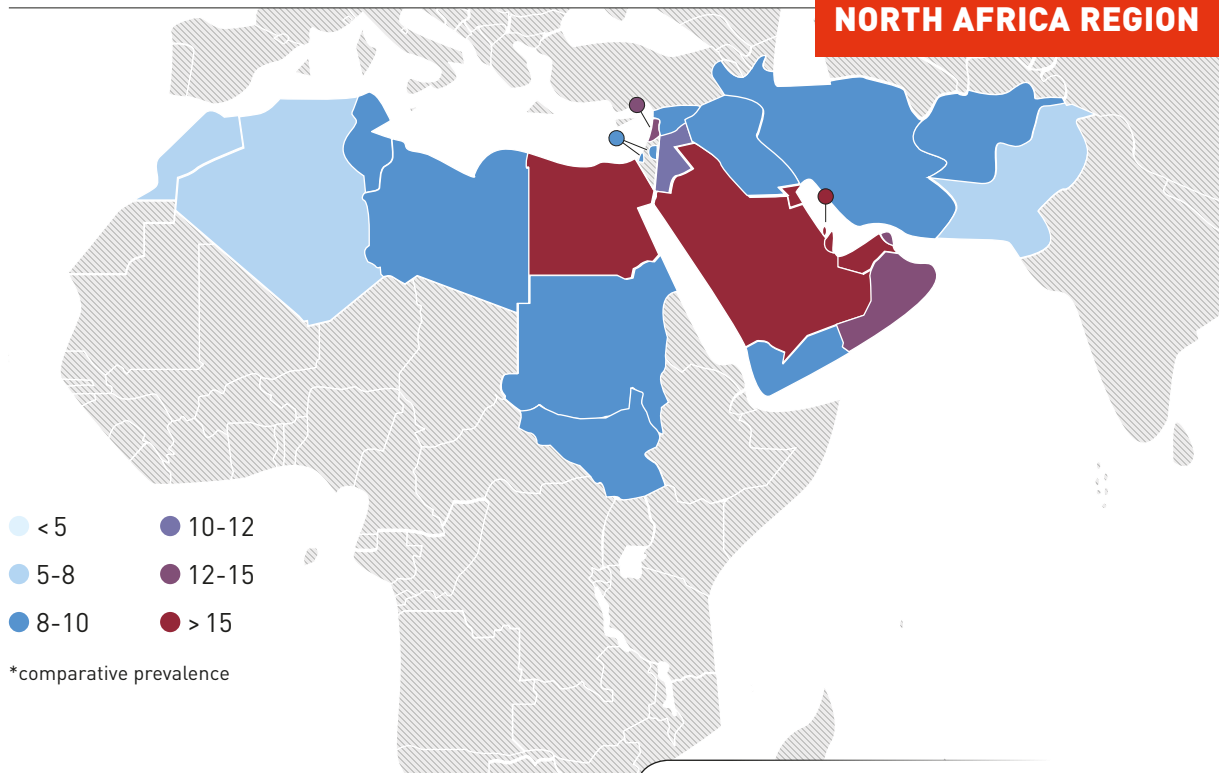
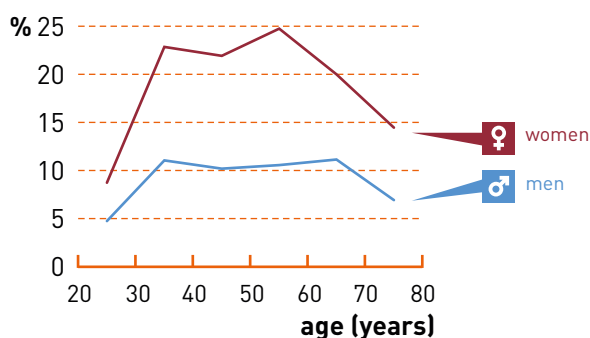
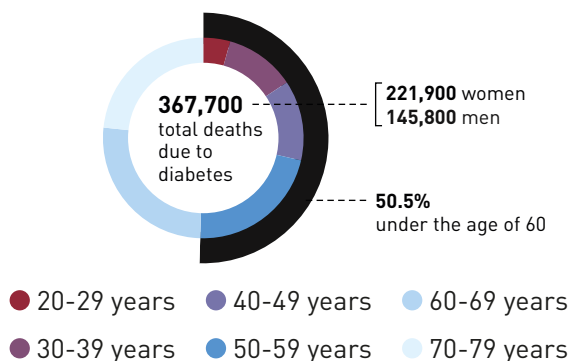


Figure 3.3 Mortality due to diabetes, Middle East and North Africa Region, 2013

Percentage of all-cause mortality due to diabetes by age (20-79 years) and sex:



Deaths due to diabetes by age:



AT A GLANCE

	2013	2035
Total population (millions)	656	896
Adult population (20-79 years, millions)	375	584

DIABETES (20-79 YEARS)

Regional prevalence (%)	9.2	11.6
Comparative prevalence (%)*	10.9	11.3
Number of people with diabetes (millions)	34.6	67.9

IGT (20-79 YEARS)

Regional prevalence (%)	6.7	7.5
Comparative prevalence (%)*	7.5	7.4
Number of people with IGT (millions)	25.2	44.0

TYPE 1 DIABETES (0-14 YEARS)

Number of children with type 1 diabetes (thousands)	64.0	-
Number of newly diagnosed cases per year (thousands)	10.7	-

HEALTH EXPENDITURE DUE TO DIABETES (20-79 YEARS, USD)

Total health expenditure, R=2*, (billions)	13.6	24.7
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*see Glossary

3.4 North America and Caribbean

With 9.6% of the adult population affected, the North America and Caribbean Region has the second-highest comparative prevalence (%) of diabetes. Most of the population in the Region lives in the USA, Mexico and Canada, which also account for the large majority of people with diabetes. However, the prevalence (%) of diabetes among adults in the Caribbean islands is high and consistently above the global average.

Prevalence

An estimated 36.8 million people with diabetes live in the Region, and by 2035 the number is expected to increase by almost half to 50.4 million. Belize (15.9%), Guyana (15.9%), Curaçao (14.5%), and Martinique (14.3%) have the highest prevalence (%) of diabetes. Meanwhile the USA, with 24.4 million, has the highest number of people with diabetes, followed by Mexico, Canada, and Haiti. A further 44.2 million people, or 13.2% of adults in the Region, have IGT, putting them at high risk for developing type 2 diabetes. This number is expected to increase to 58.8 million by 2035.

A large proportion of the burden of diabetes and IGT in the USA and Canada can be attributed to the ageing of the population. Currently, 39% of the Region's population is over 50 years of age, and this is expected to rise to 44% by 2035. By contrast, only 27% and 29% of the populations of Mexico and the Caribbean countries, respectively, are aged 50 or over. However, the proportions of people over the age of 50 for those countries are expected to increase to 39% and 34%, respectively, by 2035.

There are an estimated 108,600 children with type 1 diabetes in the Region. The USA estimate accounts for almost 80% of the total number of new cases of type 1 diabetes in children, followed by Canada.

Mortality

Diabetes was responsible for 13.5% of all deaths among adults in the Region, killing 293,000 people. More men (150,000) than women (143,000) died from diabetes-related causes in the Region in 2013. Nearly two-thirds (63%) of all deaths due to diabetes occurred in adults over the age of 60. In the USA, more than 192,000 people died from diabetes, one of the highest numbers of deaths due to diabetes of any country in the world.

Health expenditure

Health expenditure on diabetes in the Region is estimated to account for almost half (42%) of the world's diabetes-related healthcare spending. The USA alone accounted for most of the USD 263 billion spent in the Region in 2013. Apart from the USA (USD 9,800) and Canada (USD 6,177), the average diabetes-related spending per person with diabetes was low in almost every other country in the Region. The majority of Caribbean islands spent less than USD 1,000 on care per person with diabetes; Haiti spent just USD 92. Healthcare spending due to diabetes is expected to increase by 20% by 2035, the smallest increase of any Region.

Data sources

Estimates for diabetes in adults were taken from 14 data sources in the Region, representing 12 of 27 countries. Large national data collection systems in the USA and Canada provide representative information on the number of people with diabetes. However, the availability of similar data sources in the Caribbean is lacking, which leads to more uncertainty and variability around estimates for these countries.

Map 3.4 Prevalence* (%) estimates of diabetes (20-79 years), 2013

NORTH AMERICA AND CARIBBEAN REGION

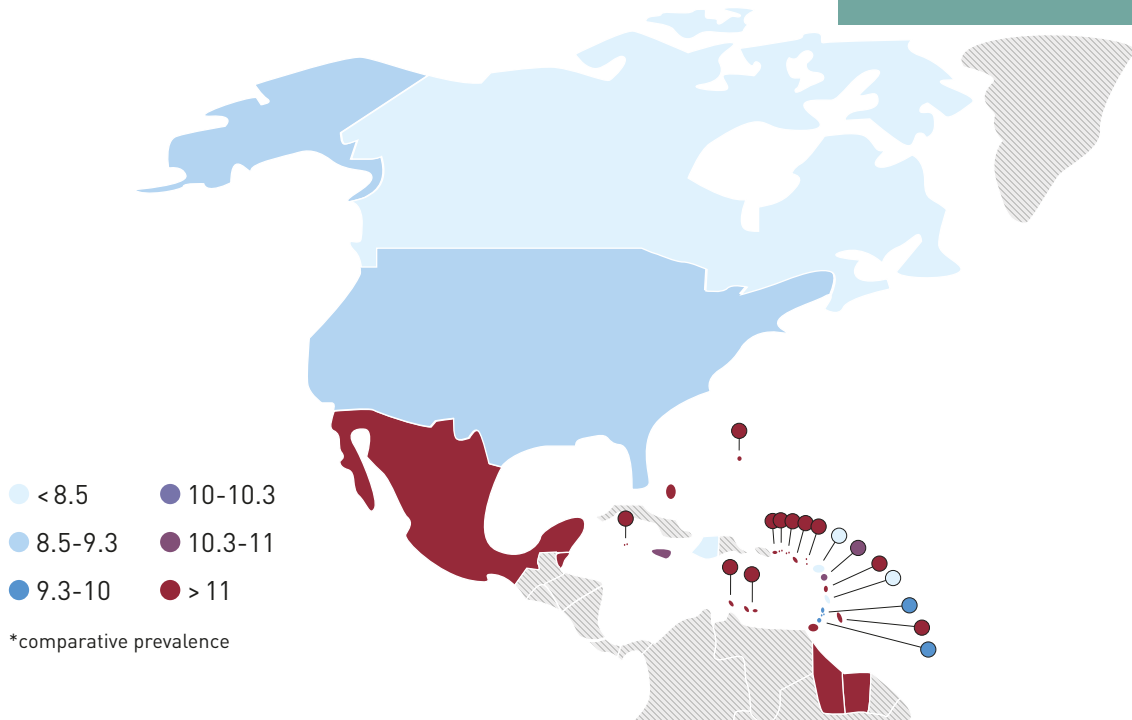
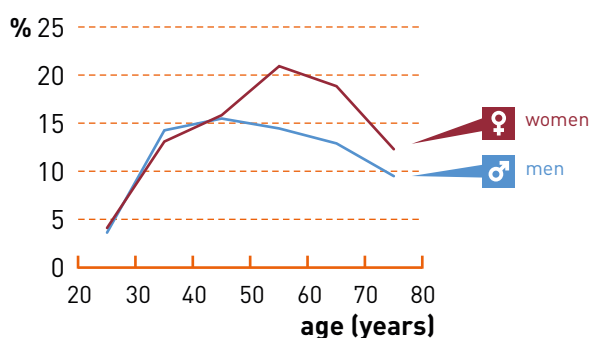
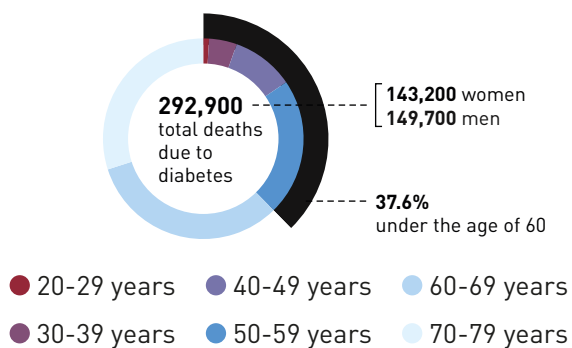


Figure 3.4 Mortality due to diabetes, North America and Caribbean Region, 2013

Percentage of all-cause mortality due to diabetes by age (20-79 years) and sex:



Deaths due to diabetes by age:



AT A GLANCE

	2013	2035
Total population (millions)	496	586
Adult population (20-79 years, millions)	335	405

DIABETES (20-79 YEARS)

Regional prevalence (%)	11.0	12.5
Comparative prevalence (%)*	9.6	9.9
Number of people with diabetes (millions)	36.7	50.4

IGT (20-79 YEARS)

Regional prevalence (%)	13.2	14.5
Comparative prevalence (%)*	12.1	12.4
Number of people with IGT (millions)	44.2	58.8

TYPE 1 DIABETES (0-14 YEARS)

Number of children with type 1 diabetes (thousands)	108.6	-
Number of newly diagnosed cases per year (thousands)	16.7	-

HEALTH EXPENDITURE DUE TO DIABETES (20-79 YEARS, USD)

Total health expenditure, R=2*, (billions)	263.1	295.8
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*see Glossary

3.5 South and Central America

The South and Central America Region includes 20 countries and territories, all of which are in economic transition. All countries and territories in the Region have similar age-distribution profiles, with about 14% of the population estimated to be older than 50 years of age. This figure is expected to increase to 25% by 2035. The Region has a markedly younger age distribution than most of North America. As urbanisation continues and populations grow older, diabetes will become an ever-greater public health priority throughout the Region.

Prevalence

An estimated 24.1 million people, or 8.0% of the adult population, have diabetes. By 2035, the number is expected to rise by nearly 60% to almost 38.5 million people. Moreover, current estimates indicate that another 22.4 million people, or 7.4% of the adult population, have IGT. Brazil has the highest number of people with diabetes (11.9 million), followed by Colombia (2.1 million), Argentina (1.6 million), and Chile (1.3 million). Puerto Rico has the highest prevalence of diabetes in adults (13.0%), followed by Nicaragua (12.4%), the Dominican Republic (11.3%), and Guatemala (10.9%).

An estimated 7,300 children developed type 1 diabetes in 2013. In the Region as a whole, 45,600 children under the age of 15 have type 1 diabetes. The majority, an estimated 31,100 children, live in Brazil.

Mortality

In 2013, 226,000 adults died due to diabetes – 11.6% of all deaths in the Region. More than half (56%) of these deaths occurred in people over the age of 60, and more in men (121,000) than in women (105,000). Brazil had by far the greatest number of deaths, with 122,000 – over half of all deaths due to diabetes for the Region.

Health expenditure

Diabetes healthcare spending in the Region was estimated at USD 26.2 billion, accounting for 4.8% of the global total. This expenditure will increase to USD 34.8 billion by 2035. The Region spends about 13% of its total healthcare budget on adults with diabetes.

Data sources

New population-based surveys have been published for diabetes in the Region in recent years which have contributed substantially to improving the estimates. As a result, 16 sources from 14 countries were used to estimate diabetes prevalence. However, there are few sources for the numbers of children with type 1 diabetes in the Region.

Map 3.5 Prevalence* (%) estimates of diabetes (20-79 years), 2013

SOUTH AND CENTRAL AMERICA REGION

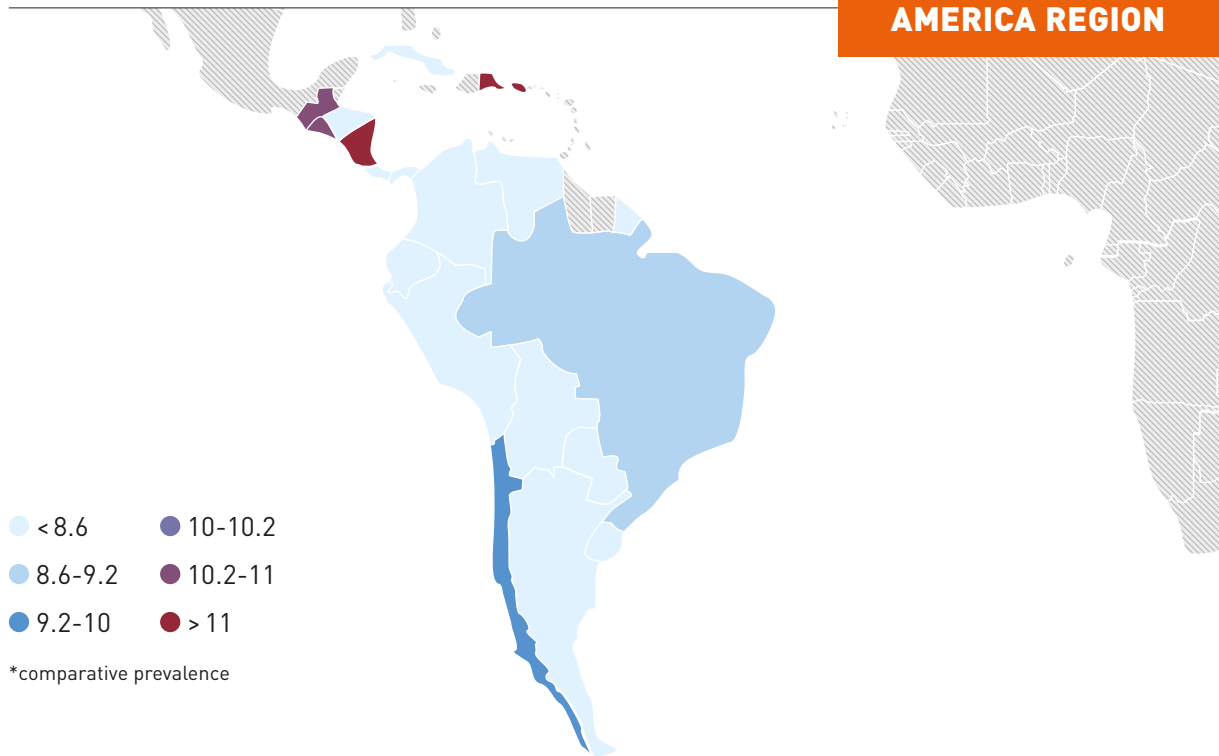
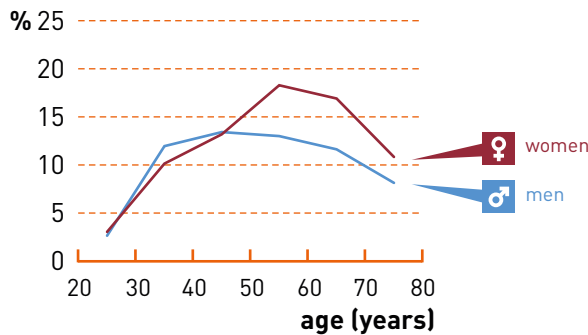
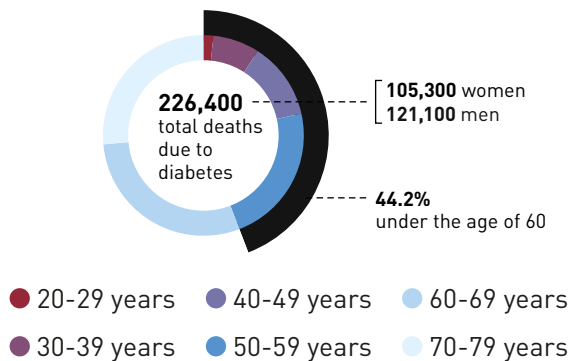


Figure 3.5 Mortality due to diabetes, South and Central America Region, 2013

Percentage of all-cause mortality due to diabetes by age (20-79 years) and sex:



Deaths due to diabetes by age:



AT A GLANCE

	2013	2035
Total population (millions)	475	568
Adult population (20-79 years, millions)	301	394

DIABETES (20-79 YEARS)

Regional prevalence (%)	8.0	9.8
Comparative prevalence (%)*	8.2	8.2
Number of people with diabetes (millions)	24.1	38.5

IGT (20-79 YEARS)

Regional prevalence (%)	7.4	6.5
Comparative prevalence (%)*	7.5	5.7
Number of people with IGT (millions)	22.4	25.5

TYPE 1 DIABETES (0-14 YEARS)

Number of children with type 1 diabetes (thousands)	45.6	-
Number of newly diagnosed cases per year (thousands)	7.3	-

HEALTH EXPENDITURE DUE TO DIABETES (20-79 YEARS, USD)

Total health expenditure, R=2*, (billions)	26.2	34.8
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*see Glossary

3.6 South-East Asia

Although the South-East Asia Region comprises only seven countries, it is one of the most populous Regions. Adults in India alone account for 86% of the Region's adult population of 883 million. There is a wide gap in per capita GDP, with Mauritius having the highest, at USD 15,800, and Nepal the lowest, at USD 1,300. India, meanwhile, is experiencing an economic growth rate second only to China.¹

Prevalence

Close to one-fifth of all adults with diabetes in the world live in the South-East Asia Region. Current estimates indicate that 8.2% of the adult population, or 72.1 million people, have diabetes, 65.1 million of whom live in India. The number of people with diabetes in the Region will increase to 123 million by 2035 – 10.1% of the adult population. A further 24.3 million people have IGT, and this will increase to 38.8 million by 2035. Mauritius has the highest prevalence of diabetes among adults in the Region, at 14.8%, followed by India at 9.1%. People with diabetes in India, Bangladesh, and Sri Lanka make up 98.8% of the Region's total diabetes population.

The projected increase in regional diabetes prevalence to 10.1% in 2035 is a consequence of ongoing large-scale urbanisation and increasing life expectancy (in India, the proportion of the population over 50 years is expected to increase from 27% to 35% between 2013 and 2035).

The South-East Asia Region has one of the highest estimates of prevalence of type 1 diabetes in children, with 77,900 affected. In 2013, an estimated 12,600 children under the age of 15 in the Region developed type 1 diabetes.

India accounts for the majority of the children with type 1 diabetes. The incidence rate for type 1 diabetes in India was frequently used to extrapolate figures in other countries in the Region, and therefore plays a pivotal role in the estimates. The large population of children in India and the widespread use of the Indian data for extrapolation have important consequences not only for the Regional total but also for worldwide estimates.

Mortality

With 1.2 million deaths in 2013, this Region has the second highest number of deaths attributable to diabetes of any of the seven IDF Regions. That figure represents 14.2% of all adult deaths in the Region. More than half (55%) of these deaths occurred in people under 60 years of age and over one-quarter (27%) in people under 50 years of age. India is the largest contributor to regional mortality, with 1.1 million deaths attributable to diabetes in 2013.

Health expenditure

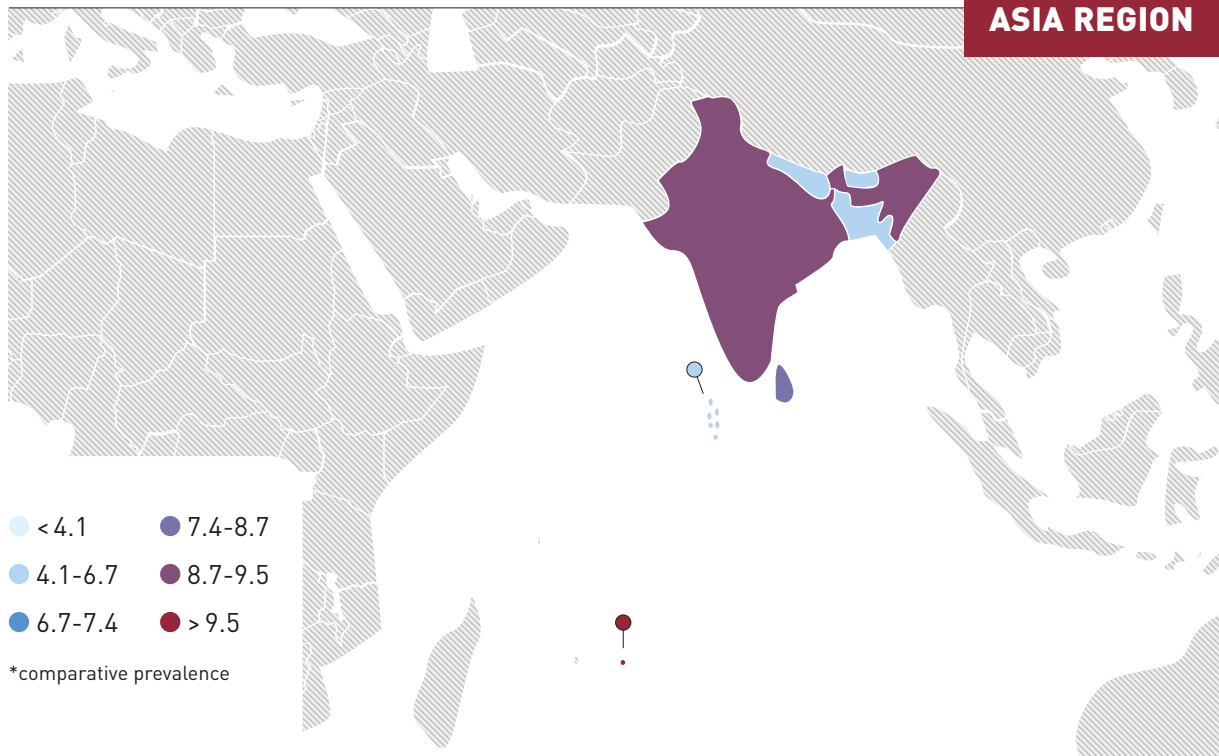
Despite the huge number of people with diabetes in the South-East Asia Region, healthcare spending on diabetes was estimated to be only USD 6 billion, accounting for less than 1% of the global total, with India estimated to have spent the largest proportion.

Data sources

All seven countries in the Region had data sources that were used to generate estimates for diabetes in adults. A total of 11 sources were used. Estimates for type 1 diabetes in children are based largely on data from India.

Map 3.6 Prevalence* (%) estimates of diabetes (20-79 years), 2013

SOUTH-EAST ASIA REGION

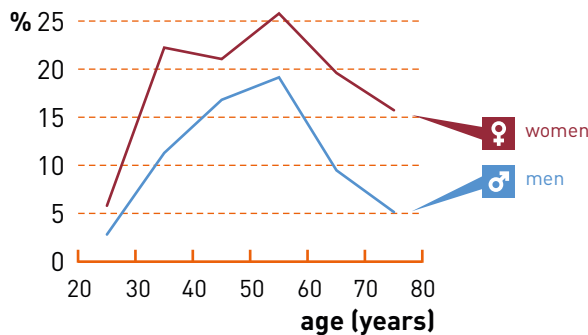


- <4.1
- 4.1-6.7
- 6.7-7.4
- 7.4-8.7
- 8.7-9.5
- >9.5

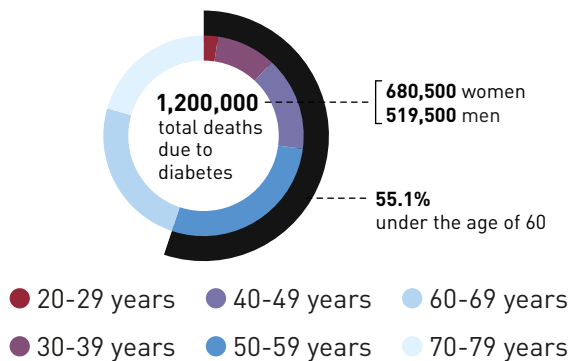
*comparative prevalence

Figure 3.6 Mortality due to diabetes, South-East Asia Region, 2013

Percentage of all-cause mortality due to diabetes by age (20-79 years) and sex:



Deaths due to diabetes by age:



AT A GLANCE

	2013	2035
Total population (millions)	1,460	1,777
Adult population (20-79 years, millions)	883	1217

DIABETES (20-79 YEARS)

Regional prevalence (%)	8.2	10.1
Comparative prevalence (%)*	8.7	9.4
Number of people with diabetes (millions)	72.1	123.0

IGT (20-79 YEARS)

Regional prevalence (%)	2.7	3.2
Comparative prevalence (%)*	2.9	3
Number of people with IGT (millions)	24.3	38.8

TYPE 1 DIABETES (0-14 YEARS)

Number of children with type 1 diabetes (thousands)	77.9	-
Number of newly diagnosed cases per year (thousands)	12.5	-

HEALTH EXPENDITURE DUE TO DIABETES (20-79 YEARS, USD)

Total health expenditure, R=2*, (billions)	6.0	8.7
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*see Glossary

3.7 Western Pacific

The world's most populous region, the Western Pacific, has 39 countries and territories with predicted populations for 2013 ranging from 1.0 billion in China to less than 1,000 on the smallest Pacific island nations of Niue and Tokelau. Similarly, the economic profiles of countries vary from a per capita GDP of over USD 43,000 in Macau SAR (Special Administrative Region), Singapore, Brunei Darussalam, Hong Kong SAR and Australia, to less than USD 3,000 in the poorest countries.¹

Prevalence

Some 138.2 million people, or 8.6% of the adult population, are estimated to have diabetes. Over the next 20 years, the number is expected to increase to 201.8 million – 11.1% of the adult population. The Western Pacific Region is home to 36% of the total number of people with diabetes in the world. There is an enormous range in the estimates for the prevalence (%) of diabetes in the Region: from the world's highest, in the Pacific island nation of Tokelau (37.5%), to one of the lowest, in Cambodia (2.9%). Pacific islands have some of the highest rates of diabetes prevalence (%). The Federated States of Micronesia (35.0%), Marshall Islands (34.9%), Kiribati (28.8%), and the Cook Islands (25.7%) closely follow Tokelau as the highest-prevalence (%) countries in the Region.

China is on the verge of being overwhelmed by diabetes. It has the highest number of people with diabetes (98 million) in the world, with a prevalence of 9.6%. If China continues its projected trend, the number of people with diabetes will reach 143 million by 2035.

An estimated 32,500 children under the age of 15 in the Region have type 1 diabetes. The largest number live in the Philippines (7,900), followed closely by China (7,700). Australia has the highest estimated incidence rate of type 1 diabetes with 22.3 cases per 100,000 children. In 2013, there were 5,300 newly diagnosed children with type 1 diabetes in the Western Pacific Region.

Mortality

With 1.9 million deaths among adults, or over 36% of global mortality due to diabetes, the Western Pacific has the highest number of deaths due to diabetes of all the IDF Regions. China alone had 1.3 million deaths due to diabetes in 2013. Substantially more men (1,080,000) than women (789,000) died of diabetes in the Region and 44% of diabetes deaths occurred in people under the age of 60.

Health expenditure

Diabetes healthcare spending in this populous Region accounts for about 16.1% of the global total. At least USD 88 billion was spent on diabetes-related care in 2013. The average diabetes-related spending on healthcare per person with diabetes varied greatly: ranging from more than USD 4,000 in Australia, New Zealand, and Japan, to less than USD 35 in Myanmar.

Data sources

Thirty-seven data sources from 27 countries were used to generate estimates of diabetes in adults in the Region. Several new studies conducted in the Pacific islands have added to the evidence of an overwhelming burden of diabetes in those countries. Estimates for type 1 diabetes in young people were based on 10 studies.

Map 3.7 Prevalence* (%) estimates of diabetes (20-79 years), 2013

WESTERN PACIFIC REGION

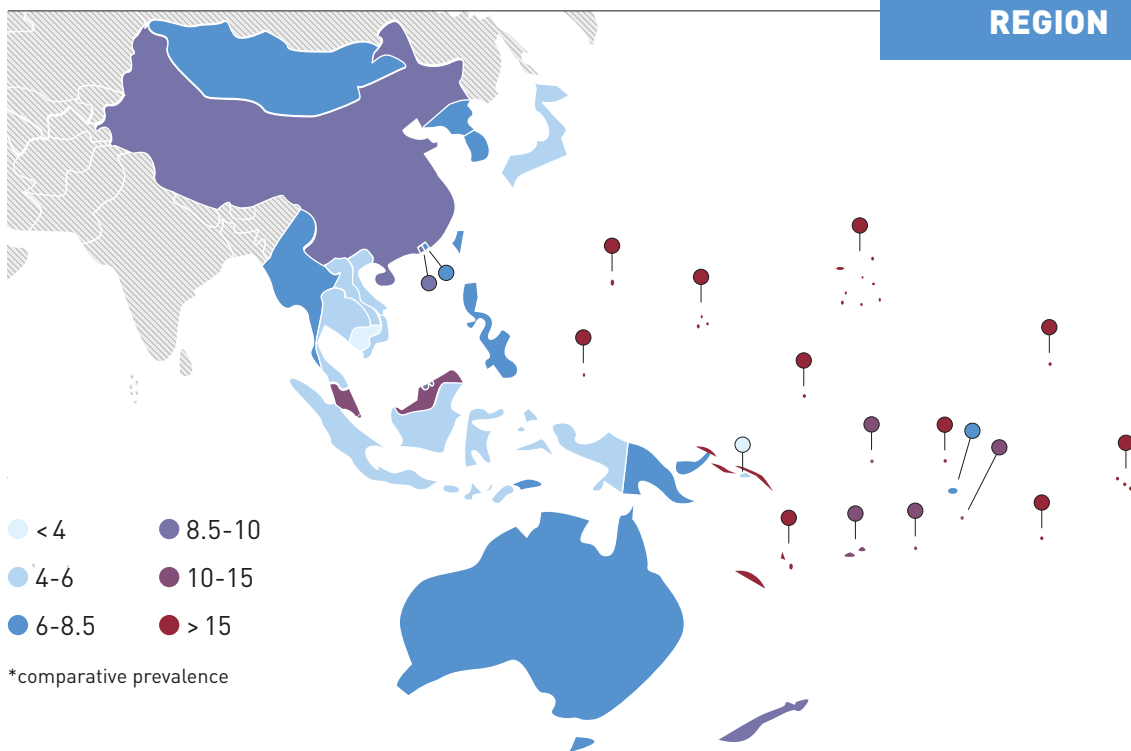
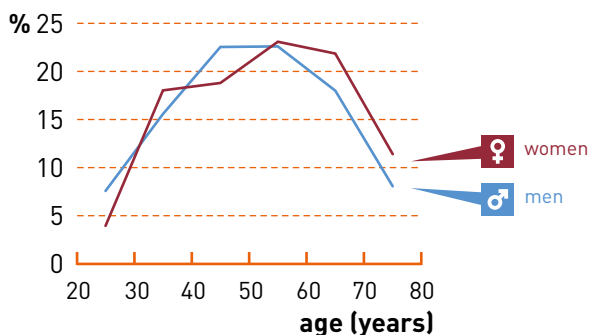
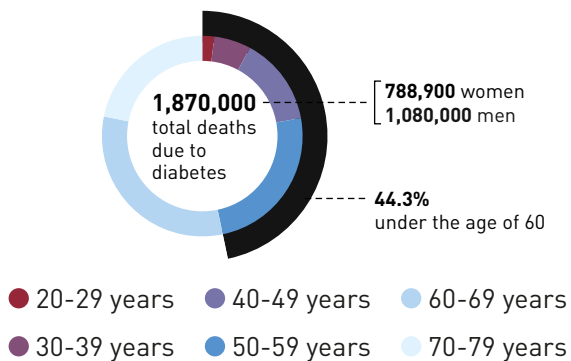


Figure 3.7 Mortality due to diabetes, Western Pacific Region, 2013

Percentage of all-cause mortality due to diabetes by age (20-79 years) and sex:



Deaths due to diabetes by age:



AT A GLANCE

	2013	2035
Total population (millions)	2,278	2,476
Adult population (20-79 years, millions)	1,613	1,818

DIABETES (20-79 YEARS)

Regional prevalence (%)	8.6	11.1
Comparative prevalence (%)*	8.1	8.4
Number of people with diabetes (millions)	138.2	201.8

IGT (20-79 YEARS)

Regional prevalence (%)	6.8	9.0
Comparative prevalence (%)*	6.6	7.8
Number of people with IGT (millions)	110.1	164.5

TYPE 1 DIABETES (0-14 YEARS)

Number of children with type 1 diabetes (thousands)	32.5	-
Number of newly diagnosed cases per year (thousands)	5.3	-

HEALTH EXPENDITURE DUE TO DIABETES (20-79 YEARS, USD)

Total health expenditure, R=2*, (billions)	88.4	98.4
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*see Glossary

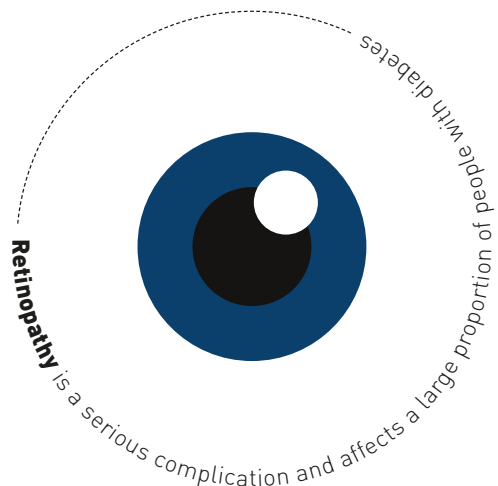




Global issues in diabetes

**ALL COUNTRIES
RICH AND POOR**
are suffering the impact
of the diabetes epidemic

**Diabetes
particularly
affects those who
are socially and
economically
disadvantaged**



Retinopathy is a serious complication and affects a large proportion of people with diabetes

Diabetic ketoacidosis is one of the most serious acute complications of diabetes in **young people**

Indigenous peoples are especially vulnerable to diabetes



Diabetes in RURAL COMMUNITIES is increasing rapidly in low- and middle-income countries

4

Global issues in diabetes

Diabetes disproportionately affects low- and middle-income countries in terms of prevalence, mortality, and morbidity. As many as 80% of people with diabetes live in developing countries, where rapid changes in lifestyle, ageing populations and transforming environments all contribute to the dramatic pace of the epidemic. The majority of people with diabetes in low- and middle-income countries are under 60 years of age and in the peak of their productive years; early disability from diabetes places a heavy and debilitating burden not only on those affected and their families, but on communities and economies as well.

Health systems in these countries are struggling to tackle this burgeoning public health crisis. Most deaths due to diabetes in low- and middle-income countries are in people under the age of 60. This reflects the inadequacy of health systems that are not yet equipped to identify and care for people with diabetes.

Complications

People with diabetes in developing countries face a greater threat from complications than those in wealthier countries. As an example, the prevalence of retinopathy among people newly diagnosed with diabetes in Egypt is 15.7% compared to Australia, where it is just 6.2%. Section 4.1 looks in detail at the evidence on rates of retinopathy among people with diabetes in different parts of the world.

It is not only adults with diabetes who are affected by a lack of access to healthcare; young people with type 1 diabetes in resource-limited settings are at increased risk of having diabetic ketoacidosis at diagnosis. A life-threatening complication in which toxic chemicals accumulate in the body, ketoacidosis is more likely to occur when symptoms of type 1 diabetes go unrecognised. Section 4.2 provides an overview of the evidence on rates of diabetic ketoacidosis among children around the world.

Vulnerable populations within and beyond borders

Country-level statistics do not provide the whole story. Within a country, some communities may be more vulnerable to diabetes through socio-economic disadvantage, lack of access to care, and marginalisation from the majority of the population.

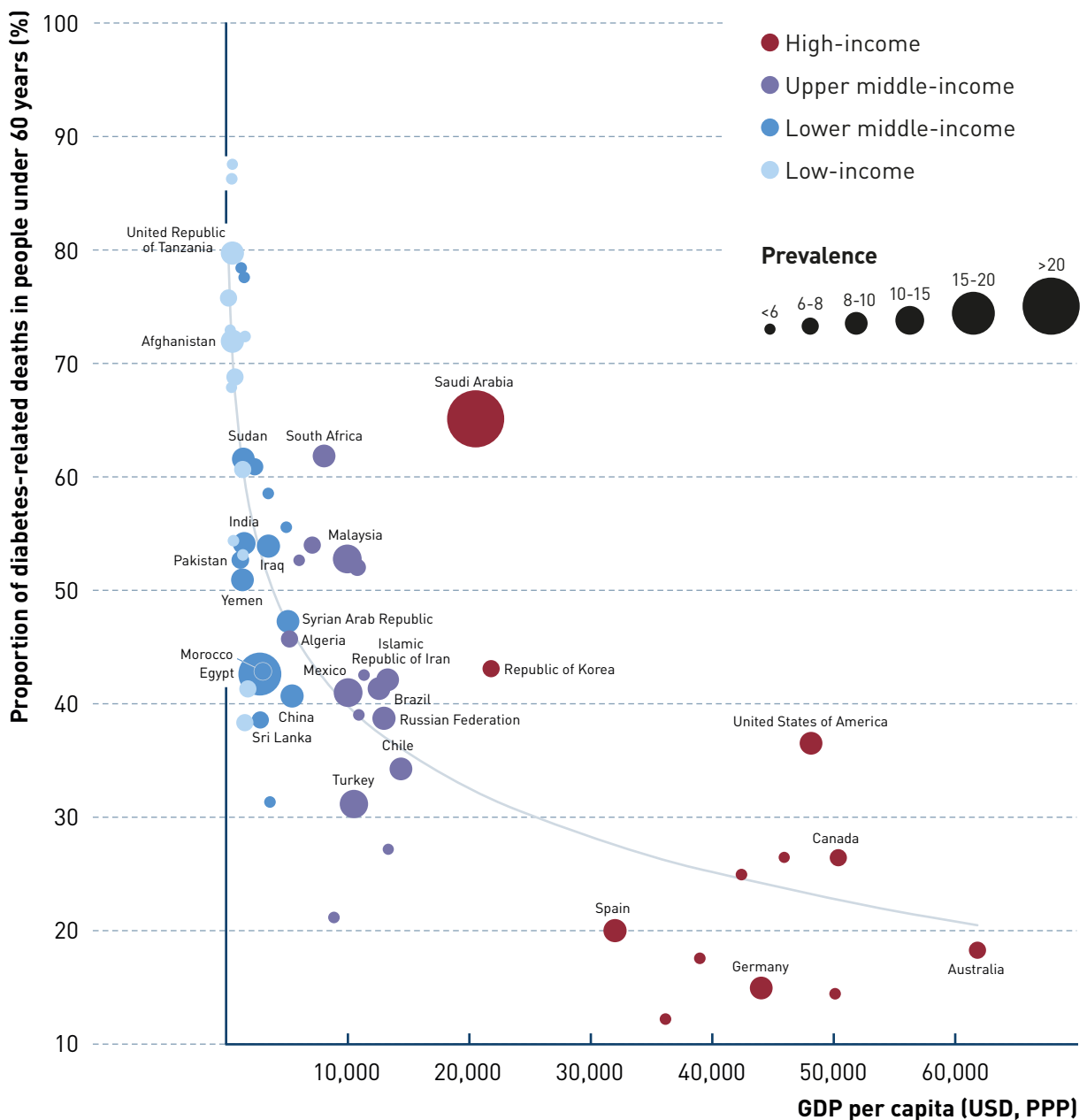
Throughout the world, studies have consistently shown the disproportionately severe impact of diabetes among Indigenous peoples. While ethnicity may play a role in contributing to this increased burden, it is social determinants that underpin many of the chronic health problems faced by these communities. Section 4.3 reviews the epidemiology of diabetes in Indigenous peoples; describes the drivers of the epidemic in those communities; and outlines solutions to redress the disparities.

Rural communities and rapid change

While urban development is a major contributor to the diabetes epidemic worldwide, rural communities may be at greater risk than previously thought. Section 4.4 examines rates of diabetes in rural communities and describes how evolving lifestyle changes are closing the gap between urban and rural diabetes prevalence.

Figure 4.1 shows a significant correlation ($R^2=0.7$) between GDP per capita (USD, PPP) and deaths due to diabetes in people under the age of 60 for countries with a large adult population. As countries increase in wealth, and health systems develop, premature deaths due to diabetes decrease. The trend is partly a result of changing demography: as countries develop, populations age, life expectancy increases and there are fewer early deaths. However, the development of health systems can also lead to increased awareness of diabetes and better access to life-saving care, which drive down the proportion of deaths due to diabetes in younger adults.

Figure 4.1 Deaths due to diabetes in people under 60 (%) by GDP per capita (USD, PPP), 2013*



* Only countries with adult populations greater than 10,000,000 were plotted.

4.1 A global review of diabetic retinopathy

Approximately one-third of people with diabetes develop some degree of diabetes-related eye damage, or retinopathy.¹ This complication, which is characterised by damage to the retina provoked by microvascular changes resulting from diabetes, can lead to blindness. Indeed, diabetic retinopathy has become the leading cause of vision loss in working-age adults. As the global prevalence of diabetes increases, so will the numbers of people with diabetes-related complications. In the absence of adequate diabetes care, and without good metabolic control, high rates of retinopathy and other complications are likely to ensue.¹

The impact of visual impairment goes beyond the individual; communities and economies lose earning capacity and productivity, and a need is created for increased social support. Thus the social and financial costs of visual impairment and blindness are significant not only to those directly affected and their families, but also to communities and entire countries.

Prevalence of retinopathy

In a large survey of studies reporting the prevalence of retinopathy, data were available from 33 countries and showed large variations: from as low as 10% in Norway to as high as 61% in South Africa in people with known diabetes; and from 1.5% in African Americans in the USA to 31% in China among people with newly diagnosed diabetes.¹

While figures are available from only a few low- and middle-income countries, the prevalence of diabetic retinopathy was higher overall in developing countries. In addition, large studies in the USA and UK have shown increased rates of retinopathy among non-Euro-ethnic groups in those countries.^{2,3} Ethnicity-related disparities are likely to be associated with a number of genetic and socioeconomic determinants.

There is a lack of data on the prevalence of diabetic retinopathy. And there are major differences in study characteristics and the methodologies employed, making comparisons between studies complex.

Risk factors and determinants

Good control of blood glucose, blood pressure and blood lipids reduce a person's risk of developing retinopathy.⁴ Social determinants of health, including poverty, poor nutrition, poor access to healthcare and lack of medications, go some way to explaining the increased prevalence of retinopathy in low- and middle-income countries and among people of low socioeconomic status. In 15 of 23 studies in developing countries and in ethnic minority groups within developed countries, the prevalence of diabetic retinopathy was over 35%.¹

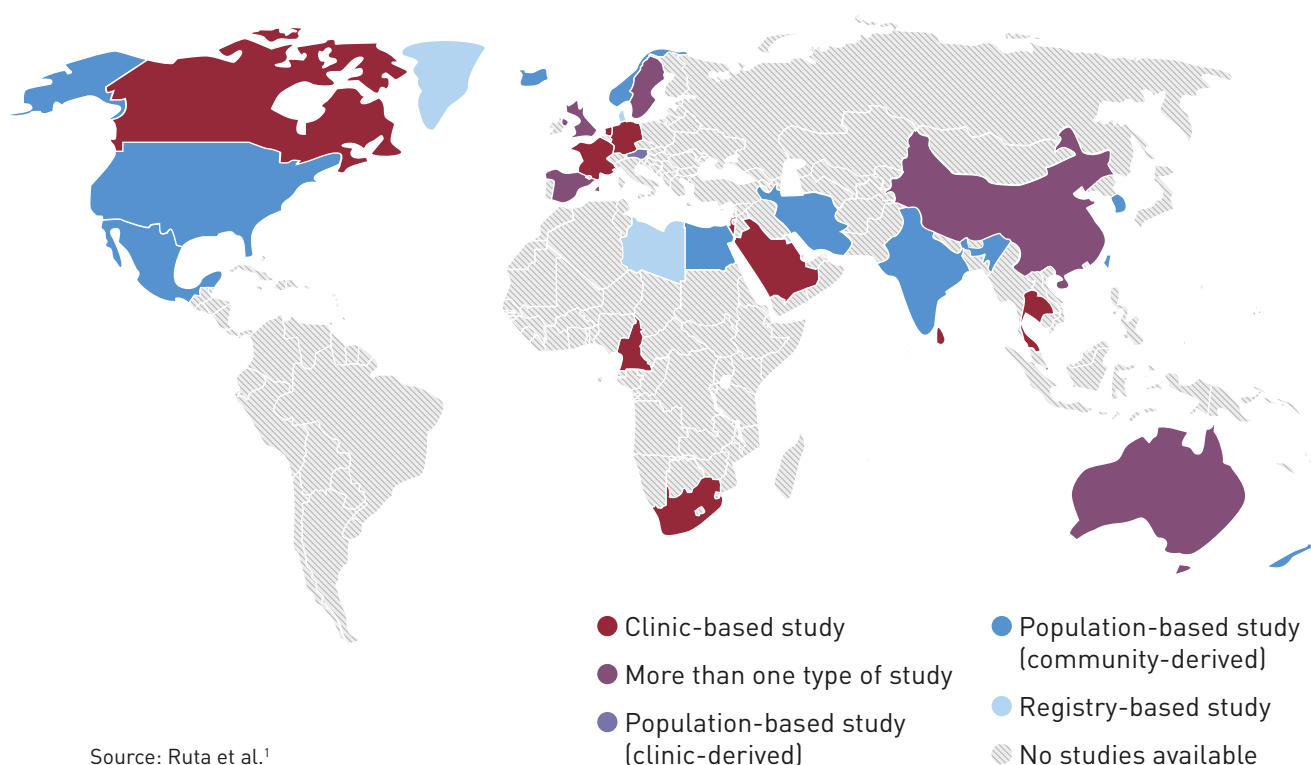
Prevention and the way forward

In places where good care and management are accessible to people with diabetes, rates of retinopathy are lower.⁵ Reductions in the prevalence of diabetic retinopathy in people with type 1 diabetes have occurred in the last 10 to 20 years. These have been associated with improvements in diabetes care and management, as well as improvements in the control of preventable risk factors.¹

While the prevalence of diabetic retinopathy in some populations is alarmingly high, active screening for this complication has been effective in reducing rates of severe diabetes-related eye damage.^{6,7}

It is imperative that more research be undertaken, particularly in countries that bear the brunt of the diabetes epidemic; and study populations and methodologies must be standardised in order to enable comparisons. This will provide useful information for policy planning and the implementation of strategies to prevent and treat retinopathy.

Map 4.1 Studies reporting the prevalence of retinopathy



Source: Ruta et al.¹

Table 4.1 Study characteristics and prevalence of retinopathy by IDF Region

IDF REGION COUNTRIES (number of studies)	Sample size Mean (range)	Range of rates in newly diagnosed diabetes	Range of rates in known type 2 diabetes	Range of rates in type 1 and type 2 diabetes
AFR Cameroon (1); South Africa (2)	300 (253 - 400)	-	32.3 - 61	24.3*
EUR Austria (1); Denmark (1); France (2); Germany (1); Iceland (1); Israel (1); Netherlands (2); Norway (3); Spain (5); Sweden (4); United Kingdom (6)	3,061 (188 - 20,788)	6.0 - 11.0	10.1 - 50.7	11.4 - 28.9
MENA Egypt (1); Islamic Republic of Iran (1); Libya (1); Saudi Arabia (1)	611 (376 - 960)	15.7*	30.0 - 37.0	41.5*
NAC Barbados (1); Canada (1); Mexico (1); United States of America (15)	579 (153 - 2,247)	1.5 - 16.9	18.2 - 48.1	26.4 - 45.3
SACA (No data)	-	-	-	-
SEA India (2); Mauritius (1); Sri Lanka (1)	1,290 (597 - 2,436)	5.1 - 15.2	12.2 - 44.3	-
WP Australia (6); China (3); Fiji (2); New Zealand (1); Samoa (1); Singapore (3); Republic of Korea (2); Taiwan (2); Thailand (2)	727 (150 - 5,313)	4.2 - 30.6	15.1 - 43.2	13.5 - 43.1

* only one study reporting data

NOTE: Rates of retinopathy reported in this table are from a variety of studies with heterogeneity in the age ranges sampled, methods used for diagnosis, year of the study, and population sampled. The estimates are not comparable to each other and are not regionally representative. The table was adapted from data presented in Ruta et al (2013).¹

4.2 Rates of diabetic ketoacidosis at diagnosis in children with type 1 diabetes

Diabetic ketoacidosis (DKA) is one of the most serious acute complications of diabetes. DKA occurs when a person has extremely high levels of blood glucose, a severe lack of insulin, and an increase in hormones that work against the action of insulin (glucagon, catecholamines, cortisol and growth hormone).¹ This leads to the breakdown of fat for energy, and as a result, chemicals (ketones) accumulate in the blood and urine.

Dangerous but preventable

Most people with DKA have type 1 diabetes but people with type 2 diabetes are also at risk during acute illness.² The later the condition is discovered, the worse the metabolic derangement and the greater the risk of permanent disability and death.³ Indeed, DKA is a leading cause of morbidity and mortality in children with type 1 diabetes.⁴ Such events are preventable if the early signs of type 1 diabetes are detected before ketoacidosis has been able to establish itself.

A global issue with regional disparities

Every year worldwide, approximately 79,100 children under 15 years of age develop type 1 diabetes. Up to 80% of these young people already have DKA when they are diagnosed with diabetes.⁵ There is a significant variation in the frequency of DKA between (and in some cases within)⁶ different countries around the world.⁷

Social determinants, including socioeconomic factors, healthcare provision, access to healthcare, awareness of the warning signs of diabetes and overall disease burden, all play a role in rates of DKA. The highest rates are found in low- and middle-income countries.⁷ In high-income countries, children with diabetes from families with higher levels of educational achievement among parents, and thus probably with a higher income, are less likely to present with DKA than their peers whose parents did not reach higher education.³

However, geographical factors may also influence the numbers of people affected. It may be that the high number of cases of DKA in countries nearer the equator are due to hot climates, which lead to more rapid dehydration and onset of hyperglycaemia, particularly in young children.⁸

Among the developed countries, the frequency of DKA is lower in countries where the background incidence of type 1 diabetes is higher.^{7,9} This may reflect overall diabetes awareness¹⁰ and thus, the ability of parents and paediatricians to recognise the early signs of type 1 diabetes. Having a first-degree relative with diabetes is associated with an up to six-fold lower risk of DKA at diagnosis.³ The capacity of a health system to initiate quickly the appropriate treatment following diagnosis is also likely to be a key factor.¹⁰

A hidden burden

For large areas of the world, particularly Africa and South-East Asia, there are very few data, or none at all, on the frequency of DKA (or even type 1 diabetes) in children.⁷ Although the disease burden from non-communicable diseases continues to grow apace worldwide, infectious diseases remain the focus of concern for paediatric healthcare in developing regions. Achieving reliable indicators of diabetes and DKA will require strengthened epidemiological surveillance of the growing burden of non-communicable disease. There is a clear need for further research using standardised data that include factors known to affect the frequency of DKA, as well as other factors, including: access to healthcare, population density, genetics, health education and healthcare resources for diabetes.

Scope for prevention

Medical spending on largely preventable DKA is substantial¹¹ and higher in people with DKA compared to those without the condition.¹² Improving awareness and the quality of care in order to prevent the development of this very common acute complication would avoid a hefty cost burden, while enhancing quality of life for large numbers of people.

Map 4.2 Rates (%) of diabetic ketoacidosis (DKA) at diagnosis of type 1 diabetes in children (0-14 years)

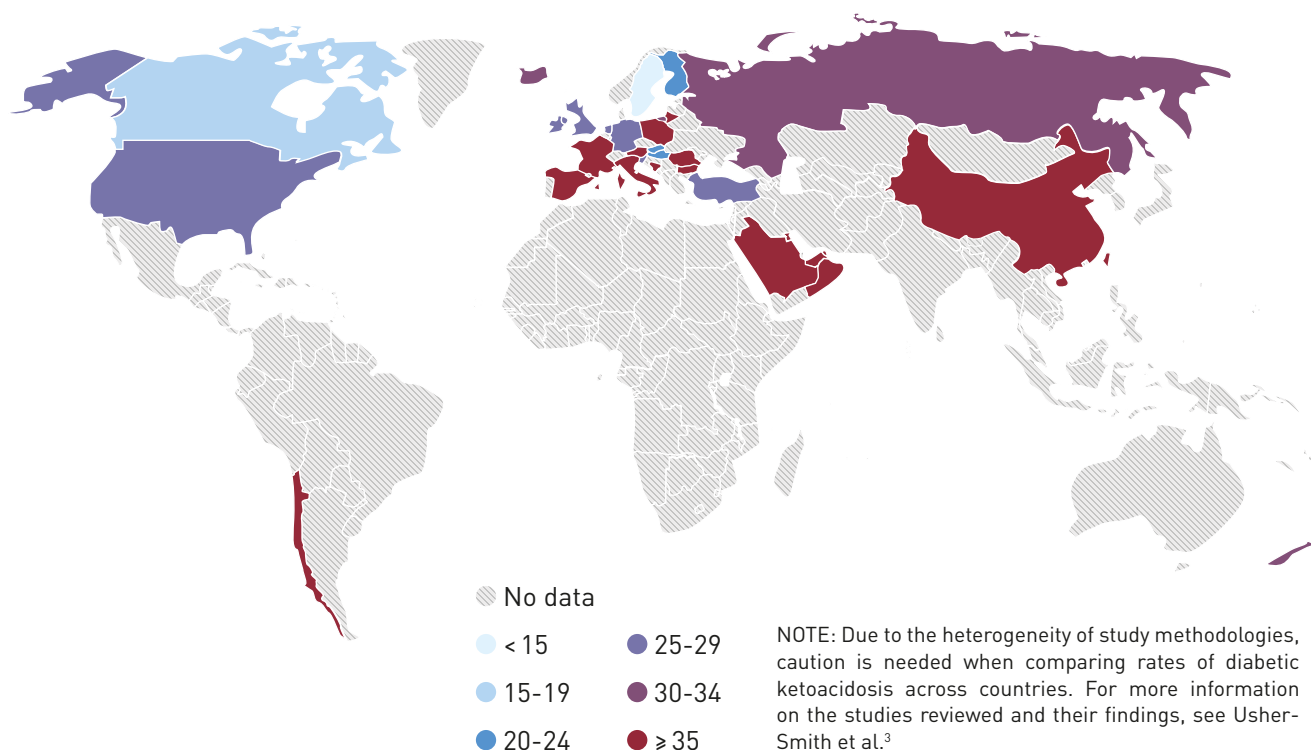


Table 4.2 Studies on the prevalence of diabetic ketoacidosis (DKA) at diagnosis of type 1 diabetes in children (0-14 years)

IDF REGION COUNTRIES (number of studies)	INCOME GROUP	Range of DKA on first presentation %	Range of incidence of type 1 diabetes in young people for countries with studies on DKA* 2013
AFR (No data)	-	-	-
EUR Austria (1); Finland (4); France (1); Germany (4); Hungary (1); Iceland (1); Ireland (1); Italy (3); Lithuania (2); Netherlands (1); Slovakia (2); Slovenia (1); Spain (2); Sweden (3); United Kingdom (4)	HIC	12.8 - 61.8	12.1 - 57.6
Bosnia and Herzegovina (1); Bulgaria (1); Poland (5); Romania (1); Russian Federation (1); Turkey (1)	MIC	29.0 - 67.0	3.2 - 17.3
MENA Kuwait (2); Oman (1); Saudi Arabia (5); United Arab Emirates (1)	HIC	37.7 - 80.0	2.5 - 31.4
NAC Canada (1); United States of America (9)	HIC	18.6 - 43.7	23.7 - 25.9
SACA Chile (1)	MIC	37.0	6.2
SEA (No data)	-	-	-
WP New Zealand (2); Taiwan (1)	HIC	29.0 - 65.0	3.8 - 18.0
China (1)	MIC	41.9	0.6

MIC=Middle-income countries HIC=High-income countries

* children (0-14) per 100,000 per year

Income group: based on World Bank 2011 Gross National Income per capita figures, except for Taiwan (based on Gross National Product per capita) – Incidence of type 1 diabetes: data from *IDF Diabetes Atlas* estimates

4.3 Diabetes in Indigenous peoples

Indigenous communities comprise over 370 million people in 90 countries, more than 5% of the world's population.¹ The increasing international interest in the health and socio-political needs of these populations was reflected in the 2007 UN Declaration on the Rights of Indigenous Peoples.² That Declaration recognises that Indigenous communities include some of the poorest and most marginalised people. While diabetes is a worldwide epidemic, Indigenous peoples shoulder a disproportionate burden.

Prevalence and incidence

A number of studies describing the prevalence of diabetes in Indigenous peoples have been conducted around the world and reflect the diversity of the nations involved as well as the burden of diabetes. In the majority of these studies, the prevalence of diabetes is much higher than in the surrounding population, ranging from around 10% in Taiwanese Ami and Atayals,³ to 30% in Australian Aborigines⁴ and 40% in North American Sioux.⁵ In addition, the Indigenous populations of the Pacific islands have the highest rates of diabetes prevalence in the world. However, some populations who still live a very traditional lifestyle have a relatively low prevalence. Among the Chilean Aymara, for example, diabetes prevalence stands at just 1.0%, compared to the countrywide estimate of 10.4% for Chile.⁶

A few longitudinal studies have also recorded high incidence rates of diabetes in these communities. For example, the seminal study involving Pima Indians living along the USA-Mexico border showed an incidence rate of 23.5 cases per 1,000 person-years in 2003,⁷ compared to a US national estimated incidence of 8 cases per 1,000 person-years in 2008.⁸

Due to shared risk factors, higher rates of type 2 diabetes also correlate with higher rates of gestational diabetes in some Indigenous populations. Between 8% and 18% of Canadian First Nation women develop gestational diabetes during pregnancy, for instance, compared to just 2% to 4% in the general population.⁹ The twin epidemics of type 2 diabetes and gestational diabetes may explain in part the dramatic increases seen in diabetes prevalence among First Nation children and adolescents.^{10,11}

Morbidity and mortality

An inevitable consequence of the higher prevalence of diabetes is a substantial rise in diabetes-related disability and death. For example, in Saskatchewan, Canada, rates of end-stage renal disease are three to four times higher among First Nation people than in other populations.¹² At least 24% of Carolinian and Chamorro people with diabetes in the Northern Mariana Islands have some form of retinopathy, a frequency 1.3 times greater than in the USA.¹³ Among Aboriginal Australians, the rate of death from diabetes is 17 times that of the general population and rates of death from heart disease are three times the national average.¹⁴

Social determinants of health

The most pressing and consistent picture across Indigenous communities is one of shared disadvantage in health and social status. Reframing diabetes within a paradigm of social determinants of health reveals it as a product of unjust conditions and environments, rather than as a disease rooted solely in individual pathology and responsibility.¹⁵ Furthermore, significant barriers to care for Indigenous peoples, including fragmented healthcare, poor chronic disease management, high healthcare staff turnover, and limited or non-existent health surveillance,¹⁶ complicate the already difficult management of diabetes in disadvantaged populations.

Strategies for prevention and care

Interventions to reduce the burden of diabetes must be implemented, which prevent the development of the disease as well as ensure adequate and appropriate management.¹⁷ A successful example of a prevention programme was achieved in a population of Zuni school children in the USA via education to reduce the consumption of sugar-added beverages and increase knowledge of diabetes risk factors, together with the opening of a youth fitness centre. These methods successfully reduced insulin resistance in the target population.¹⁸

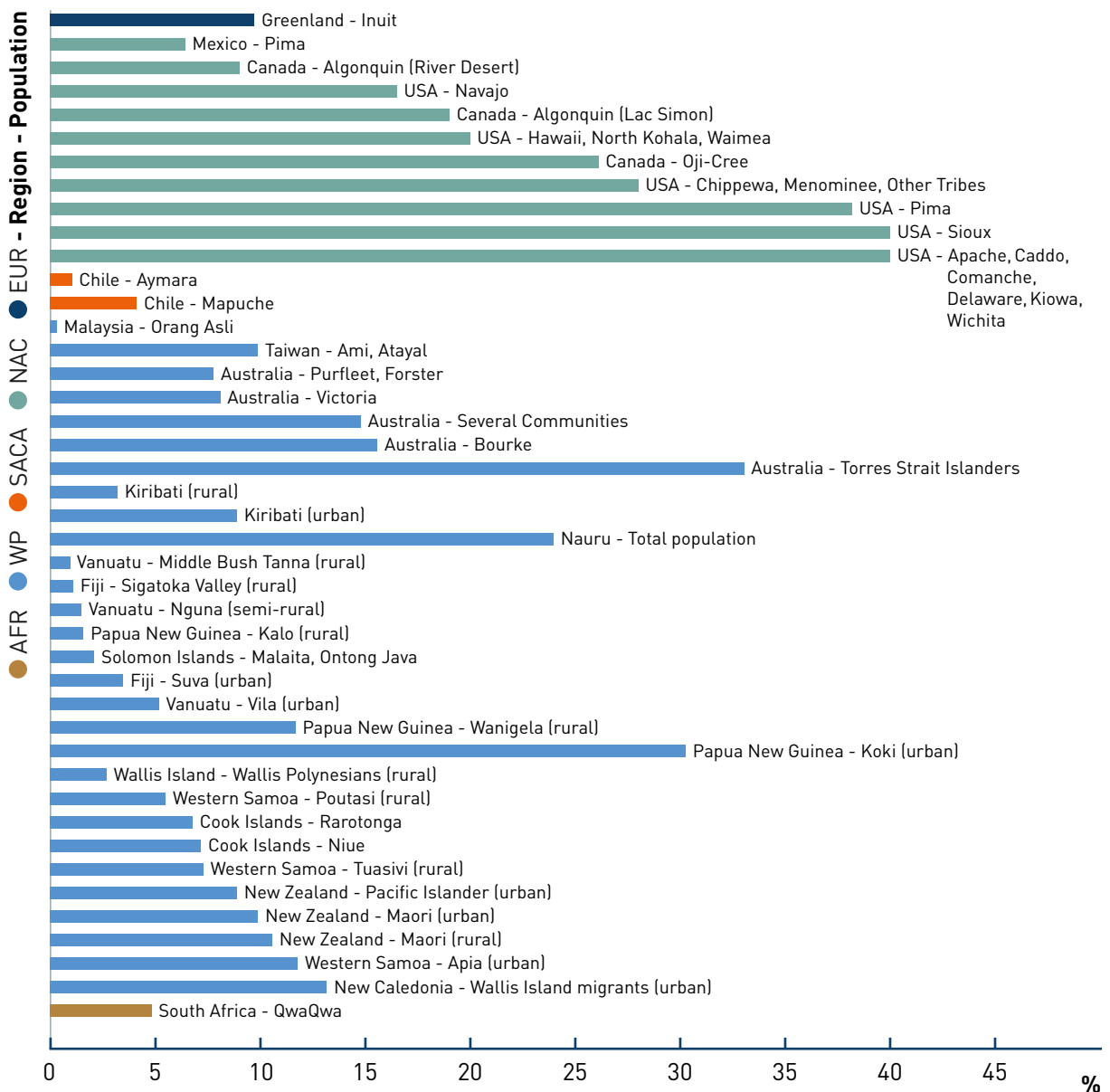
Empowering communities

While there are global comparisons to be drawn regarding the effects on Indigenous peoples of the social determinants of health, cultural heterogeneity is an enduring feature, whether viewed within or across cultural groups. There is no 'pan-Indigenous reality' to speak of. If maximum efficacy is to be achieved, it is essential that community care be adapted to the specific cultural context of the population concerned and delivered to a standard that meets national practice guidelines.¹⁹

Indigenous peoples' leadership, stewardship and control over their own health issues are fundamental to change.

Empowerment is a necessary pre-requisite for overcoming the health disadvantages suffered by Indigenous peoples. Yet this has not yet received due attention in national approaches to diabetes prevention and control. Until Indigenous peoples can drive the agenda, disparity is likely to remain an enduring, albeit unacceptable, reality.

Figure 4.2 Age-adjusted prevalence (%) of diabetes in Indigenous peoples



Adapted with permission from *Diabetes Research and Clinical Practice* (Source: Yu and Zinman¹⁹)

4.4 Diabetes in rural communities

Over the next 20 years, the number of people with diabetes will increase dramatically.^{1,2} The dramatic rise in the magnitude of diabetes and other non-communicable diseases is predicted to impede initiatives to reduce poverty in low-income countries and communities, and poses a threat to equitable development in all emerging economies.³ However, patterns within low- and middle-income countries are changing rapidly as rural communities develop and within-country migration increases.

Rapid changes within countries

Massive rural-to-urban migration continues to affect communities throughout the developing world. Large numbers of rural people attempt to escape abject poverty, many also fleeing from the dangers of armed conflict, by moving to cities in search of safety and a better quality of life, as well as closer proximity to healthcare services. The consequent behavioural and nutritional transitions translate into a widespread increase in risk factors for type 2 diabetes.^{4,5} However, while rising rates of type 2 diabetes in the urban areas of low- and middle-income countries are widely documented, there is evidence to suggest that rural prevalence of diabetes in low- and middle-income countries is also high and on the increase.⁴

The increase of diabetes

The pooled prevalence of rural diabetes among low- and middle-income countries has been estimated at 5.6% over a 25-year period.⁴ Moreover, it quintupled in that time, a staggering increase that was also observed in a review study of diabetes prevalence in rural India.⁶ A recent large-scale study in rural China estimated the prevalence of rural diabetes from 2005 to 2010 to be close to 9%, the highest ever seen in the developing world.⁷

Given that rural communities in low- and middle-income countries share many of the same socioeconomic factors, it is likely that diabetes prevalence among rural communities around the world is already higher than was previously estimated. The rapid pace of development in cities is being matched by changes in access to food and transport in rural communities.

Wide variation

Complicating matters further, there exists a significant regional variation in rural diabetes prevalence across the world's low- and middle-income countries. From one study, the Middle East and North Africa had the highest prevalence at 7.7%, while sub-Saharan Africa had the lowest at 2.4%.⁸ This variation could be due in part to the differences in the degree of transition, in terms of lifestyle, economy and demographics, that is occurring in these regions.^{9,10} The lack of data on community- and region-specific factors might potentially hinder efforts to prevent and treat diabetes in rural settings.

Moreover, in regions such as Latin America, with a large, very broadly diverse rural population, some rural communities appear to be avoiding the upward trends seen in other regions.¹¹ Such examples might be the source of strategies to stem the rise of type 2 diabetes in rural populations elsewhere.

Trends and consequences

IDF projects a rise in diabetes prevalence of 55% worldwide by 2035. However, the findings cited above suggest that the rise may be even greater, particularly when we consider that 80% of the people with diabetes live in low- and middle-income countries. Rapid demographic changes have set the scene for ever-greater challenges to the countries that are least equipped to tackle the global diabetes epidemic.

In addition, in low- and middle-income countries, awareness of diabetes and access to healthcare are low or non-existent in many rural areas.

The way forward

Diabetes education is widely referred to as the cornerstone of care; and diabetes self-management education has proven effective in lowering complications in high-income countries worldwide.¹² But access to culturally appropriate diabetes education is severely limited in many low- and middle-income countries, and non-existent in rural areas of the developing world.¹³

Some success has been achieved in improving adequate access to healthcare in isolated rural areas by implementing novel interventions.¹⁴ There may be opportunities to use new technologies, especially mobile phones¹⁵, to improve access to

care in isolated communities. More data on the prevalence of diabetes in rural communities, and the effects of rapid changes there, are needed to understand and prioritise the effects of the epidemic there.

Map 4.3 Prevalence* (%) of diabetes in rural settings (20-79 years), 2013

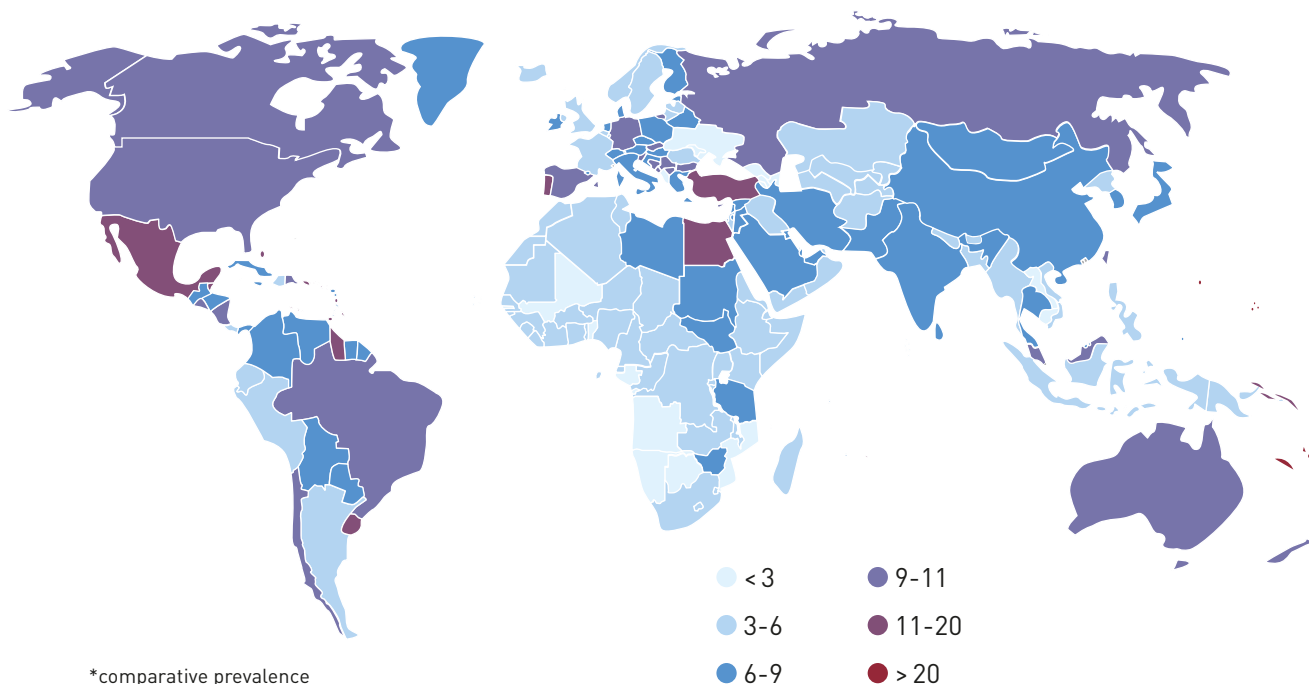


Table 4.3 Diabetes in rural settings by IDF Region (20-79 years) in 2013


IDF REGION	Number of people with diabetes in rural settings MILLIONS	Adult population in rural settings MILLIONS	Percentage of diabetes cases in rural settings %	Percentage of adult population in rural settings %
AFR	8.8	250.6	44.3	61.4
EUR	14.1	190.2	25.1	28.9
MENA	11.9	174.9	34.6	46.7
NAC	6.9	64.3	18.8	19.2
SACA	4.4	55.4	18.1	18.4
SEA	37.8	607.2	52.5	68.7
WP	52.1	727.0	37.7	45.1
World	136.1	2,069.5	35.6	45.3





Linking local to global

IDF is driving
the GLOBAL AGENDA
on diabetes using
the Global Action Plan
for the prevention
and control of NCDs

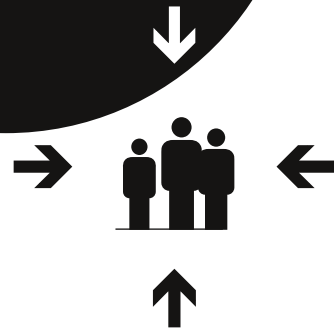


**IDF LINKS THE LOCAL TO
THE GLOBAL** from grass roots
activism by people with diabetes,
to influencing global health and
development policy

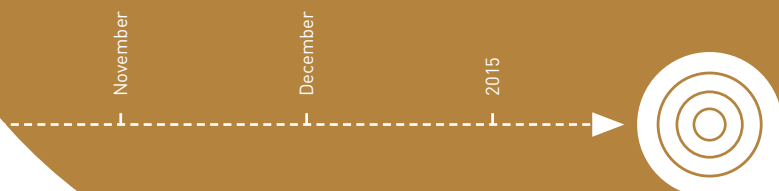
IDF will support
Member Associations in
**holding
governments
accountable**
to progress on diabetes

IDF is the leader in providing support for health professionals working in diabetes education and care

IDF programmes, campaigns, and events are a global platform raising awareness for people with diabetes



IDF calls for an **OVERARCHING HEALTH TARGET** in the post-2015 development framework that will ensure a whole-of-society approach to prevention, treatment, care and support for diabetes and NCDs



5 Linking local to global

5.1 Driving the global agenda on diabetes

Over the last six years, IDF has made significant progress in building global political recognition for diabetes and non-communicable diseases (NCDs) on the global health agenda. The UN Resolution 61/225 on World Diabetes Day in 2006, the UN Political Declaration adopted at the UN High-Level Meeting on NCDs in 2011 and the UN Conference on Sustainable Development (Rio+20) in 2012 all affirmed that diabetes and other NCDs are leading threats to development in the 21st century, and need to be addressed on a global scale.¹⁻³

A global plan of action

Building on the momentum of the 2011 UN Political Declaration on NCDs, the 66th World Health Assembly, in May 2013, further catalysed international commitment and action on a global response to the diabetes and NCD epidemics. WHO Member States unanimously adopted a voluntary Global Action Plan for the prevention and control of NCDs.⁴

Grassroots advocacy to sustain this momentum is more critical than ever. With the Global Action Plan's menu of policy options for governments to achieve global targets, diabetes and NCD advocates are now equipped with a set of tools to encourage concerted government action. The role of IDF and its Member Associations – in collaboration with

governments and other decision-making bodies – in the implementation and surveillance of the Global Action Plan is essential to the successful achievement of these targets.

Diabetes in the global targets for NCDs

Included in the Global Action Plan, governments adopted the first global monitoring framework for NCDs, including a set of nine targets (Table 5.1).⁵ This was a significant breakthrough for diabetes and NCD advocacy, signalling a new era of action and accountability. Having agreed to an ambitious set of targets and 25 indicators, governments will be reporting regularly on progress.

The targets will require government action on prevention and have the potential to improve access to essential life-saving treatment for millions of people with diabetes worldwide.

Quantifiable targets are already making an impact. The agreement on the targets has bolstered IDF's and the NCD Alliance's campaign to ensure diabetes and NCDs are included in the future development agenda after the Millennium Development Goals expire in 2015.

Unmet challenges

While global targets that will improve the lives of people with diabetes are considered a major victory, access to affordable high-quality essential medicines and technologies remains unacceptably low. A substantial proportion of people with diabetes lack access to the medicines, technologies and good-quality care they need.⁶

The target for 80% access to essential medicines and technologies can be a powerful driver for major reform. The Millennium Development Goal target for essential medicines has achieved major progress in HIV/AIDS and other infectious diseases, but not for diabetes. In low-income settings, essential medicines for diabetes and other NCDs remain significantly less accessible than those for acute infectious diseases.⁶

Table 5.1 Objectives and targets from the Global Action Plan for the prevention and control of NCDs⁴

VISION:

A world free of the avoidable burden of non-communicable diseases

OBJECTIVES

1. To raise the priority accorded to the prevention and control of non-communicable diseases in global, regional and national agendas and internationally agreed development goals, through strengthened international cooperation and advocacy
2. To strengthen national capacity, leadership, governance, multisectoral action and partnerships to accelerate country response for the prevention and control of non-communicable diseases
3. To reduce modifiable risk factors for non-communicable diseases and underlying social determinants through creation of health-promoting environments
4. To strengthen and orient health systems to address the prevention and control of non-communicable diseases and the underlying social determinants through people-centred primary health care and universal health coverage
5. To promote and support national capacity for high-quality research and development for the prevention and control of non-communicable diseases
6. To monitor the trends and determinants of non-communicable diseases and evaluate progress in their prevention and control

VOLUNTARY GLOBAL TARGETS

1. A 25% relative reduction in risk of premature mortality from cardiovascular diseases, cancer, diabetes, or chronic respiratory diseases
2. At least 10% relative reduction in the harmful use of alcohol, as appropriate, within the national context
3. A 10% relative reduction in prevalence of insufficient physical activity
4. A 30% relative reduction in mean population intake of salt/sodium
5. A 30% relative reduction in prevalence of current tobacco use in persons aged 15+ years
6. A 25% relative reduction in the prevalence of raised blood pressure or contain the prevalence of raised blood pressure, according to national circumstances
7. Halt the rise in diabetes and obesity
8. At least 50% of eligible people receive drug therapy and counselling (including glycaemic control) to prevent heart attacks and strokes
9. An 80% availability of the affordable basic technologies and essential medicines, including generics, required to treat major non-communicable diseases in both public and private facilities

5.2 Including diabetes in development

Since their adoption in 2000, the Millennium Development Goals have defined and determined the global development agenda. The greatest strength of MDGs 4, 5 and 6 was the popular and political support they galvanised for health, which was recognised as central to development. They provided a clear vision and measurable targets to improve specific health outcomes. As a result, there have been considerable improvements in child mortality, maternal, infant and child health, and infectious diseases, including HIV/AIDS and malaria. However, although the MDGs raised awareness, incited action and gathered resources to improve specific health outcomes, they excluded urgent health priorities such as diabetes and NCDs. The disease-specific approach driven by the MDGs exacerbated the unequal distribution of limited resources in health systems, leaving them ineffective and unsustainable.

Health beyond disease

The future development agenda needs to respond to a new epidemiological, demographic and political reality, and a paradigm shift is needed if progress is to continue. The overarching health priority in the post-2015 framework must be to improve the health and wellbeing of people and populations. A new approach focused on the social, economic and environmental determinants of health is required that reflects the official definition of health, not as the absence of disease, but as “a state of complete physical, mental and social wellbeing”.¹

Setting the future agenda

One of the major successes of the MDGs was the adoption of specific targets and monitoring frameworks for tracking progress by donor and recipient countries. Targets that are easy to monitor yet broad enough to include health beyond specific diseases will be crucial to success of the post-MDG development goals.

With the purpose of contributing to the development of new targets, IDF gathered input from Member Associations and Regional Offices to identify priorities for diabetes and NCDs in the post-2015 framework. Subsequently, IDF participated in global thematic consultations held by the UN on health, food security and nutrition, disability, inequalities, and environment, all of which will inform the post-2015 development framework.

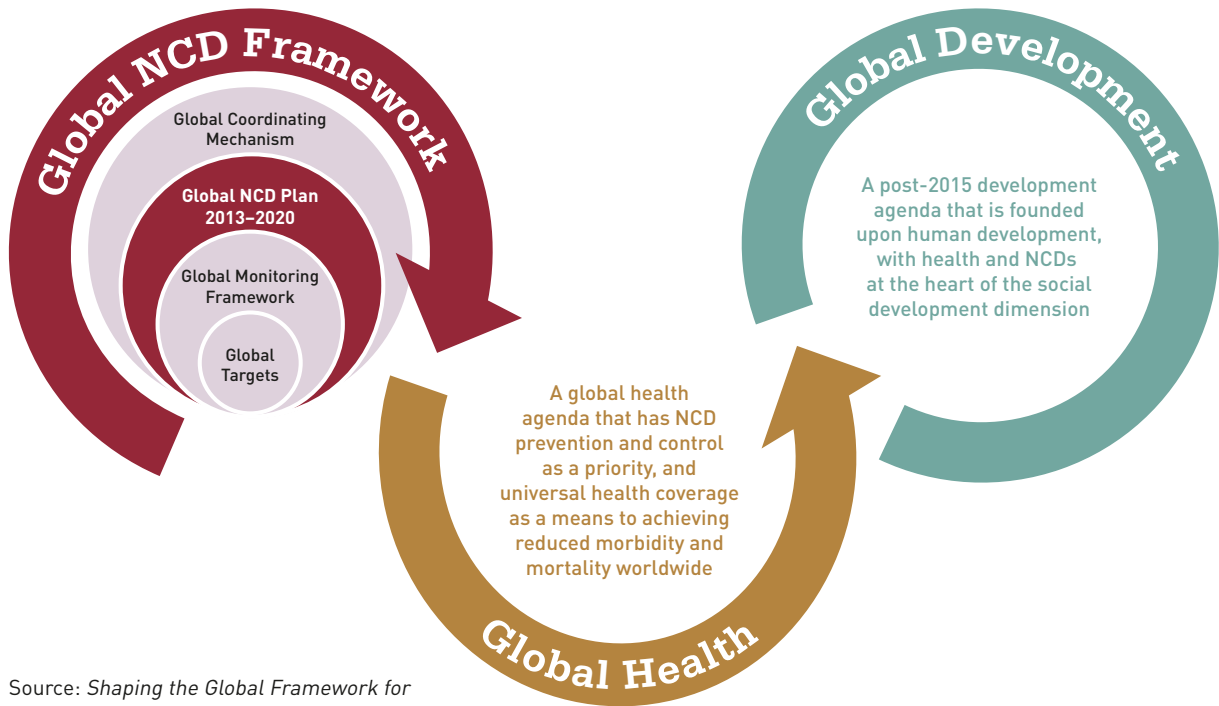
IDF is calling for an overarching health goal that will ensure a whole-of-society approach to prevention, treatment, care and support for diabetes and NCDs. A health-centred goal will drive the development of a new type of health system that is preventive and can provide lifelong care and disease management. The inclusion of health indicators across all of the post-2015 goals will ensure that progress in terms of global development aligns with real progress for global health.

A new target for health

Member States attending the high-level dialogue on health in the post-2015 agenda, in March 2013, reached the consensus that reducing the burden of NCDs has become a global priority. However, an intense debate continues on the way in which the comprehensive health goal should be framed.

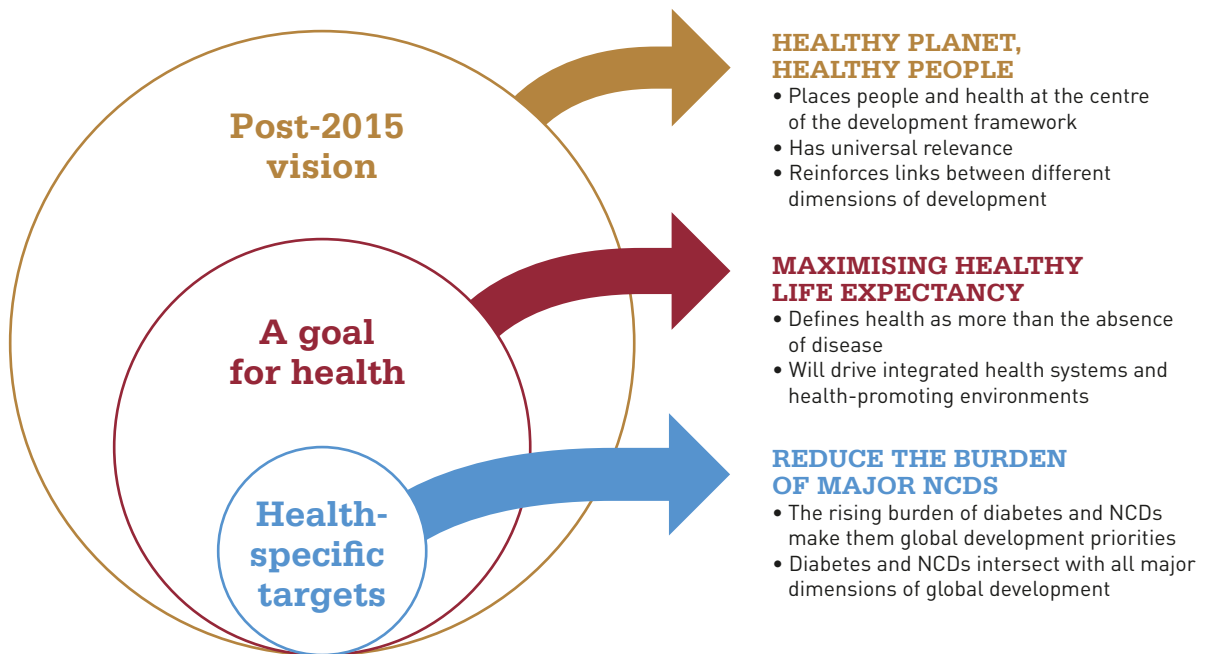
IDF is committed to the inclusion of health indicators across all of the post-2015 goals, as a way to ensure that progress in global development has benefits – not costs – for global health.

Figure 5.1 Using the Global Framework to set the development agenda for NCDs



Source: *Shaping the Global Framework for NCD Prevention and Control*. NCD Alliance. Geneva, Switzerland, 2012.

Figure 5.2 Targets related to diabetes for the post-2015 development framework



Source: *Shaping the Global Framework for NCD Prevention and Control*. NCD Alliance. Geneva, Switzerland, 2012.

5.3 The IDF Diabetes Scorecard

Despite the commitments agreed to at the 2013 World Health Assembly (Section 5.1), many countries lack the means to hold their governments to account on progress toward those targets. The experience of the HIV/AIDS community has shown that civil society has a crucial part to play in monitoring the implementation and progress of government-made commitments in the community. To this end, IDF has developed a tool for Member Associations to measure progress on the targets set by the Global Monitoring Framework and to ensure public health accountability.

Tracking progress for action





The structure and contents of the IDF Diabetes Scorecard are the result of close consultation and thorough testing by IDF's network and international experts. It is shaped around a structured questionnaire covering the four elements considered critical for an effective response to diabetes: prevention, treatment, rights, and political leadership.

The Scorecard elicits information on the existence of country plans and policies for diabetes and other NCDs; as well as government progress against specific targets, such as reducing the level of physical inactivity and achieving 80% access to affordable medicines and technologies. Member Associations will be able to submit their country data online or on paper.

Mapping progress

The Scorecard will show very clearly which countries and regions are succeeding, which are falling behind, and where further action or support is needed to meet the goals of the Global Monitoring Framework. The fully tested tool will be a powerful accessory for future public health advocacy, and may be adapted for use by groups advocating for other diseases, including other NCDs.

After the data are collected, the results will be displayed according to a colour-coded system. Different colours represent different stages of progress:

-  No national policy on diabetes exists and there are no plans to develop one
-  A policy exists or is planned but no action has been taken
-  A policy exists and receives funding; implementation has started
-  A policy exists and receives funding and is being implemented nationwide

IDF will continually publish and update the results of the Scorecard findings through its Member Associations. In order to strengthen their advocacy activities, Member Associations will also receive a toolkit of follow-up material, including sample press notices, letters to Health Ministers, and briefing packs.

Measuring success

Addressing the 2011 High-Level Meeting on NCDs, WHO Director-General Margaret Chan applied the well-known adage "what gets measured gets done" to the public health battle against NCDs like diabetes. The IDF Diabetes Scorecard will measure the efforts and progress of governments in tackling the many challenges posed by diabetes.

Figure 5.3 IDF Diabetes Scorecard

DIABETES SCORECARD

Tracking Progress for Action

The Political Declaration adopted at the United Nations (UN) Summit on Non-communicable diseases (NCDs) in September 2011 was a historic pledge to accelerate action on diabetes and NCDs, and build a healthier world.

At the 66th World Health Assembly in May 2013, governments will underpin this vision with clear accountability architecture – including the “25% by 2025” mortality goal and a set of ambitious targets on prevention and treatment. Together, the Political Declaration and targets are a firm commitment by the world’s governments to drive progress for the 371 million people with diabetes and millions more at risk.

The Global Diabetes Scorecard is a unique civil society project that will enable IDF and our network of Member Associations to hold governments accountable to commitments on diabetes. We will track progress for action on four core key elements – prevention, treatment, rights and political leadership – that are critical for an effective national response. The tool is being developed through a comprehensive consultative process with experts in diabetes, NCDs and global health.

As shown in the *RIWAIOS* response, the role of civil society in tracking and guiding progress will be critical to ensure the UN Political Declaration and targets are successfully implemented on the ground. **If commitments are merely words on paper, diabetes will continue to cause 4.8 million deaths a year and result in avoidable disease, disability and suffering for millions more.**

The Global Diabetes Scorecard will be launched at the World Diabetes Congress in Melbourne in December 2013, followed by implementation at the national level in 2014. Looking ahead, IDF will align Scorecard reporting to official UN and World Health Organisation (WHO) timelines, supporting governments to advance meaningful action on the global diabetes epidemic.

For more information, and to find out how to get involved, visit www.idf.org/global-diabetes-scorecard.



International Diabetes Federation
The International Diabetes Federation (IDF) is an umbrella organisation of over 200 national diabetes associations in over 100 countries. The Federation has been leading the global diabetes community since 1935. IDF's mission is to accelerate diabetes care, prevention and a cure worldwide.

DADA
DADA is a leading international healthcare group, offering health insurance, care homes and hospitals, specialist health services and chronic disease management. With its shareholders, DADA intends its profits to fund its purpose of caring healthier and happier lives.

IDF and DADA: Working together for a healthy world

DIABETES SCORECARD

Tracking Progress for Action

The International Diabetes Federation is developing the first global scorecard for measuring government commitments on diabetes.

Below is a snapshot of how we will track progress on the UN Political Declaration on Noncommunicable Diseases signed in 2011 and Global targets adopted in 2013.

POLITICAL LEADERSHIP, COMMITMENT AND RESOURCES

- Existing multisectoral diabetes plan or NCD plan including diabetes
- Whole of government approach for diabetes prevention and control
- Government funding for prevention and health promotion, treatment and surveillance

PREVENTION


- Progress towards halting the rise in diabetes and obesity
- Progress towards a 10% reduction in physical inactivity
- Regulate marketing of foods and beverages to children
- Reduce sugar, salt and saturated fats in foods

TREATMENT, MANAGEMENT + CARE

- Progress towards a 25% reduction in premature mortality from NCDs by 2025
- Progress towards 80% coverage of essential medicines and basic technologies
- Early diagnosis and detection services for diabetes available
- Access to self-management education for diabetes

RIGHTS AND EMPOWERMENT

- Gender sensitive approach to diabetes prevention and control
- Initiatives to involve and strengthen capacity for vulnerable populations and communities
- Partnerships between government and diabetes civil society, NGOs and patient groups



www.idf.org

5.4 Training health professionals in diabetes

The increasing global prevalence of NCDs is placing enormous and growing demands on health systems. Preparing the health workforce to respond to the associated challenges is a crucial issue; health professionals play a critical role in improving access to, and the quality of, healthcare for people with diabetes. Yet, as highlighted in the World Health Report 2006: *Working Together for Health*, there is a worldwide shortage of almost 4.3 million health workers, including doctors, midwives, nurses and support workers.¹

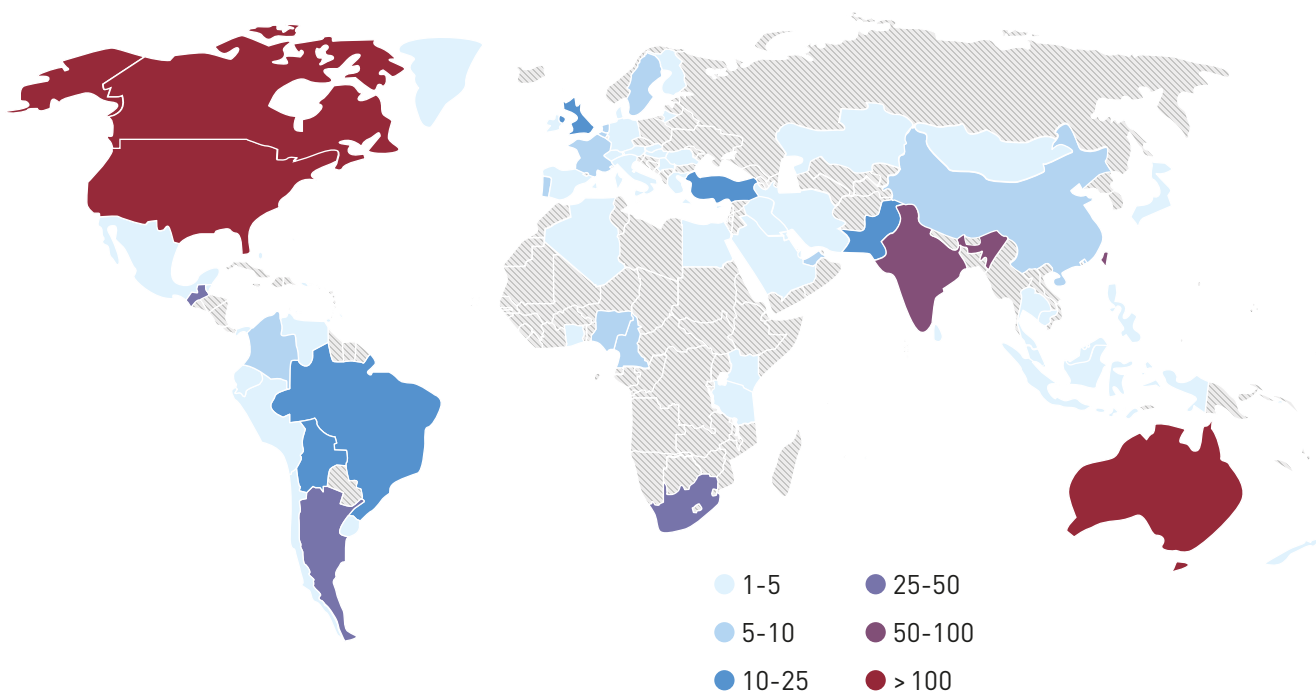
There is growing recognition of the urgent need to respond to the shortage. In 2011, the Political Declaration on NCDs recognised the importance of a well-functioning health system to deliver care to people with NCDs like diabetes. The Declaration also confirmed the need to provide training for health workers and to put in place processes to ensure that they remain in the workforce.²

Diabetes education is the cornerstone of diabetes management. Diabetes self-management education and on-going support are an essential part of diabetes care. Self-management education enables people with diabetes to manage their disease, improve health outcomes, and to become the pivotal figure in the management of their healthcare.^{3,4}

A situation analysis

IDF conducted a cross-sectional study to determine how health professionals are educated to work in diabetes care and education. Overall, IDF collected 1,116 responses from health professionals; 68% were from high-income countries and the remainder (32%) from low- and middle-income countries.

Map 5.1 Respondents to a survey on diabetes education in health professionals



BASIC PROFESSIONAL EDUCATION

People with diabetes receive care and education from professionals over a range of healthcare disciplines. The number of curriculum hours devoted to the provision of diabetes education and care during health professional basic education varies from country to country, and by discipline. In low- and middle-income countries, 37% of respondents stated that they had received at least 90 educational hours as part of their basic diabetes education training, while 13% reported receiving 10 hours or less. More than 50% of respondents also developed their diabetes knowledge and skills through work experience and self-study (Table 5.2).

CONTINUOUS PROFESSIONAL EDUCATION

Continuous professional education is essential to ensure that diabetes knowledge and skills remain up to date. It is compulsory in some countries in order to retain registered professional status.

Respondents described how they developed their diabetes knowledge and how their skills varied at different stages of their careers. Most developed knowledge and competence through work experience and self-study; very few attended formal educational programmes as part of their training (Table 5.2).

Table 5.2 Development of knowledge and skills in diabetes education and care by income group

	Training before starting work in diabetes		Training during first 12 months working in diabetes		Most recent training	
	%		%		%	
	LMIC	HIC	LMIC	HIC	LMIC	HIC
Self-study	65	72	73	84	42	55
Work experience	70	72	83	89	-	-
Basic professional training/education	61	60	-	-	-	-
Personal experience with diabetes	29	20	32	19	-	-
Education programmes:						
- less than 24 hours (less than 3 days)	7	10	10	10	19	17
- between 24 and 40 hours (3 to 5 days)	15	11	13	9	7	6
- between 40 and 80 hours (5 to 10 days)	13	7	11	5	6	2
- between 80 and 120 hours (10 to 15 days)	6	3	5	3	4	1
- between 120 and 320 hours (15 to 40 days)	9	5	5	2	3	1
- 320 hours or more (40 days or more)	12	13	11	5	15	3
Diabetes conference/workshop/seminar	-	-	56	61	-	-
International conference	-	-	-	-	29	10
National conference	-	-	-	-	47	47
Regional conference	-	-	-	-	37	41
Hospital in-service programme	-	-	-	-	27	19

LMIC=Low- and middle-income countries HIC=High-income countries

Certification and formal degree programmes

In the 1980s, a number of institutions initiated programmes to provide training for certified diabetes educators, including the Canadian Diabetes Association, the National Certification Board for Diabetes Educators (USA) and the Australian Diabetes Educators Association. Since then, certification (also referred to as credentialing) has become the standard for formal recognition of specialty practice and knowledge in some countries.

Certified diabetes educators have the capacity to improve diabetes care, for instance, by helping to improve glucose control.⁵ Yet not all countries have systems for certification: 43% respondents from low- and middle-income countries stated that they did not have a formal credential. Moreover, only 32% had a degree or diploma in diabetes education (Table 5.3).

Table 5.3 Respondents with diabetes certification and/or a degree or diploma in diabetes education by IDF Region and income group

IDF REGION		Diabetes certification	Diabetes degree
COUNTRIES (number of respondents)	INCOME GROUP	number (%)	number (%)
AFR Cameroon (5); Ghana (3); Kenya (3); Nigeria (6); South Africa (27); Tanzania (3)	LMIC	18 (38.3%)	7 (14.9%)
EUR Austria (1); Belgium (1); Cyprus (1); Denmark (1); Finland (4); France (7); Germany (3); Greece (2); Ireland (1); Italy (1); Netherlands (7); Portugal (7); Slovakia (1); Spain (3); Sweden (8); Switzerland (4); United Kingdom (21)	HIC	39 (48.8%)	24 (30.0%)
Hungary (1); Kazakhstan (1); Lithuania (3); Romania (4); Serbia (1); Turkey (13)	LMIC	17 (73.9%)	8 (34.8%)
MENA Kuwait (2); Qatar (3); Saudi Arabia (3); United Arab Emirates (6)	HIC	4 (28.6%)	0 (0.0%)
Algeria (2); Egypt (1); Islamic Republic of Iran (3); Iraq (3); Pakistan (10)	LMIC	2 (10.5%)	4 (21.0%)
NAC Antigua and Barbuda (2); Bahamas (1); Barbados (2); Bermuda (1); Canada (258); Curaçao (1); Puerto Rico (1); Trinidad and Tobago (3); USA (215)	HIC	356 (73.5%)	27 (5.6%)
Belize (1); Mexico (3)	LMIC	1 (25.0%)	2 (50.0%)
SACA Argentina (45); Bolivia (11); Brazil (12); Chile (1); Colombia (5); Ecuador (2); Guatemala (25); Panama (3); Peru (2); Uruguay (1); Venezuela (2)	LMIC	61 (55.9%)	47 (43.1%)
SEA India (56); Mauritius (2); Sri Lanka (1)	LMIC	33 (55.9%)	17 (28.8%)
WP Australia (128); Brunei Darussalam (1); Hong Kong SAR (7); Japan (1); New Zealand (1); Singapore (1); Taiwan (69)	HIC	175 (84.1%)	73 (35.1%)
Cambodia (2); China (7); Fiji (3); Indonesia (2); Malaysia (4); Mongolia (1); Philippines (2); Thailand (2)	LMIC	5 (21.7%)	5 (21.7%)

LMIC=Low- and middle-income countries HIC=High-income countries

Support for continuing professional education

Health professionals make an essential contribution to the health system. Ideally, health institutions should encourage professionals to participate in continuous professional education activities, and support them in the application of their new knowledge.

Almost 72% of respondents from low- and middle-income countries reported receiving support from their organisations to learn about diabetes education and care. More than half of the centres surveyed (55%) encouraged professionals to take advantage of learning opportunities outside the workplace by providing the necessary time away from work. A smaller number provided financial assistance (34%) for continuous professional education.

In-service programmes using existing resources can complement or serve as an alternative to professional education without creating the need for people to travel to attend courses.⁶ The survey found various approaches to learning, including case study discussions, seminars and journal clubs.

Use of educational resources

Educational resources, such as guidelines, recommendations and standards, are essential to the effectiveness of health professionals. Studies undertaken in a number of countries demonstrate that using diabetes guidelines and standards improves health outcomes.⁷⁻¹⁰

Most of the respondents reported using such resources to aid clinical decisions or when planning diabetes care: 83% from low- and middle-income countries indicated that they use clinical practice guidelines or recommendations; and 71% use diabetes education guidelines or standards. In high-income countries, the percentages were 94% and 85%, respectively.

IDF resources are designed to raise the profile of education and improve the expertise of diabetes educators and other health professionals. According to the survey results, IDF publications were used by 80% of respondents from low- and middle-income countries and 42% from high-income countries (Table 5.4). The widespread use of these resources underscores the importance of disseminating and increasing accessibility to these educational materials.

Study limitations

This was an exploratory, descriptive study. The results can be used only to describe the group of healthcare providers who responded to the questionnaire; they cannot be generalised to any larger population. Self-administrated questionnaires bring their own set of caveats and limitations, including: the potential for low response rates, no opportunities to clarify issues, language and literacy issues, and access issues.

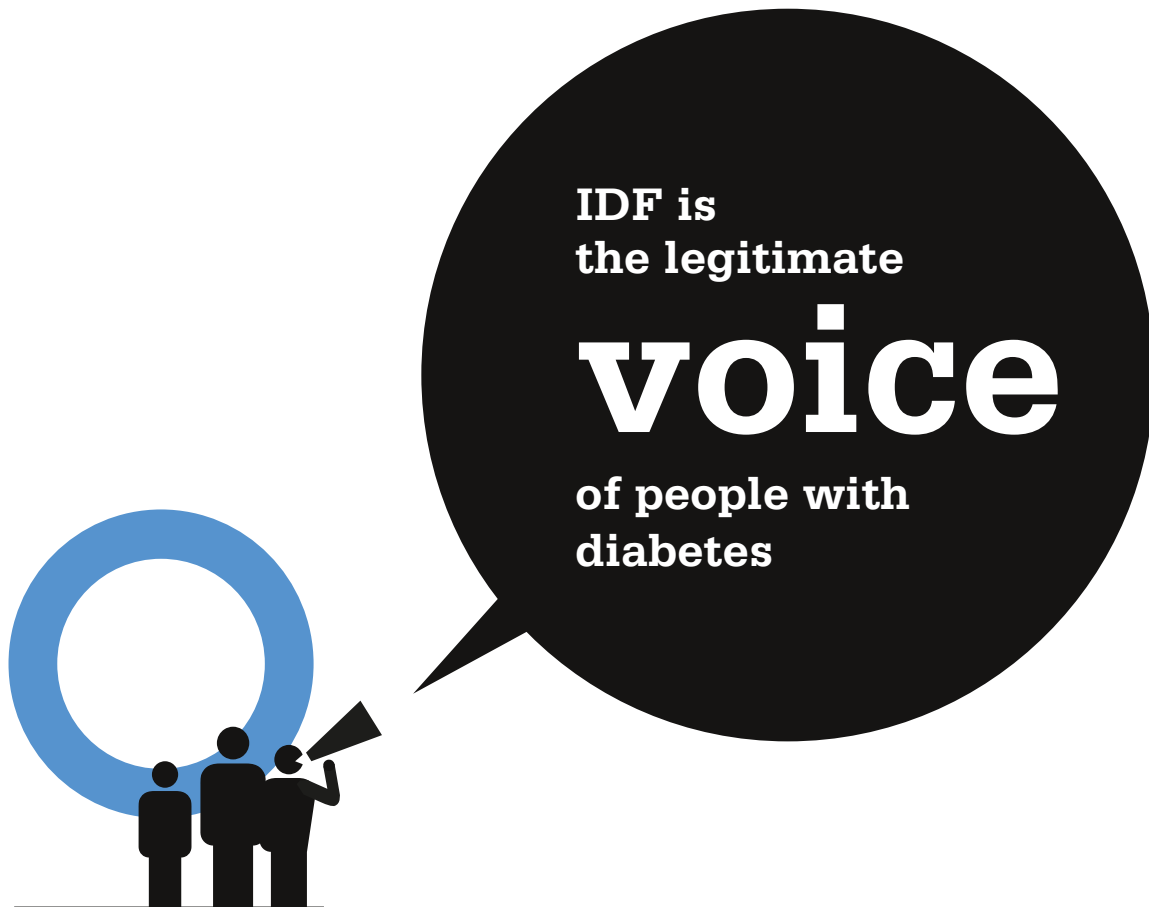
Table 5.4 Use of IDF diabetes education resources

	HIGH-INCOME COUNTRIES	LOW- AND MIDDLE-INCOME COUNTRIES
Use IDF educational resources	42%	80%
Global IDF/ISPAD Guideline for Diabetes in Childhood and Adolescence	12%	30%
IDF Diabetes Education Modules	15%	49%
IDF International Curriculum for Diabetes Health Professional Education	15%	32%
IDF International Standards for Diabetes Education	28%	55%
Pregnancy and Diabetes Guidelines	13%	32%
IDF Consensus Statement on sleep apnoea and type 2 diabetes	4%	9%
IDF Global Guideline for Type 2 Diabetes	23%	61%





Resources and Solutions



IDF is
the legitimate

voice

of people with
diabetes

There are SOLUTIONS
for managing and curbing
the diabetes epidemic



**IDF has a suite of
position statements and
clinical guidelines for
health professionals**

6

Resources and solutions

6.1 Diabetes in older people

There are nearly a billion people over the age of 60.¹ They constitute more than 11.1% of the world's population. By 2035, the number of older people is expected to rise to 1.5 billion – 17.6% of the population. Population growth, improvements in public health and prolonged life expectancy have contributed to a steady increase in the number of older people (defined as people aged 60 years or over) and there has been a concomitant increase in the number of older people with diabetes. IDF estimates the global prevalence of diabetes in people aged between 60 and 79 to be 18.6%, more than 134.6 million people, accounting for over 35% of all cases of diabetes in adults. By 2035, that number is projected to increase beyond 252.8 million.

Older people with diabetes have an increased rate of diabetes-related complications, and are much more likely to present with comorbid conditions. These include physical disability, cognitive dysfunction, falls and fractures, depression, pressure ulcers, impaired vision and hearing, and unrecognised and under-treated pain.² In such cases, a personalised approach to diabetes management is imperative. Yet there is a profound lack of clinical trials involving older people, which complicates the development of evidence-based care guidelines.³

Prevalence and epidemiology

The prevalence of diabetes in older people ranges from 2.3% in Niger up to 64.6% in the Federated States of Micronesia. The North America and Caribbean Region has the highest regional prevalence, at 22.1%, while that of the Africa Region is 9.6%. Overall, diabetes prevalence is slightly higher in women than men (19.0% vs 18.3%).

Diabetes prevalence in older people continues to increase with age. However, there is a levelling off and, in some cases, a downward trend as mortality increases.

Effects of diabetes in older people

Older people with diabetes are at increased risk of some form of functional impairment resulting from diabetes complications.

When combined with the natural aging process and other age-related conditions, diabetes contributes to poorer outcomes in older people compared to those without diabetes. Peripheral neuropathy, present in up to 70% of older people with diabetes,⁴ increases the risk of falls and fractures,⁵ as do hypo- and hyperglycaemic events.

People with diabetes are 1.5 times more likely to develop dementia than those without diabetes.⁶ This in turn makes it difficult for many older people

with diabetes to recognise and seek treatment for dementia. In addition, several studies show a strong association between diabetes and depression, which may also affect people's ability to care for themselves.⁷

Risks in treatment

Kidney and liver function are frequently reduced in older people, which leads to abnormalities in the metabolism and excretion of medication. This in turn contributes to an increased risk of hypoglycaemia.^{8,9} Moreover, reduced kidney function can lead to hyperglycaemia due to dehydration, increasing the risk of delirium.³ At the same time, older people are at increased risk of undernutrition and loss of skeletal mass: while their micronutrient requirements are similar to those of younger adults, older people have lower energy needs and often have a small appetite and reduced sensation of thirst.^{2,10}

Management and care

A tailored approach to care for older people with diabetes is imperative in order to minimise potentially severe adverse effects. Comorbidities

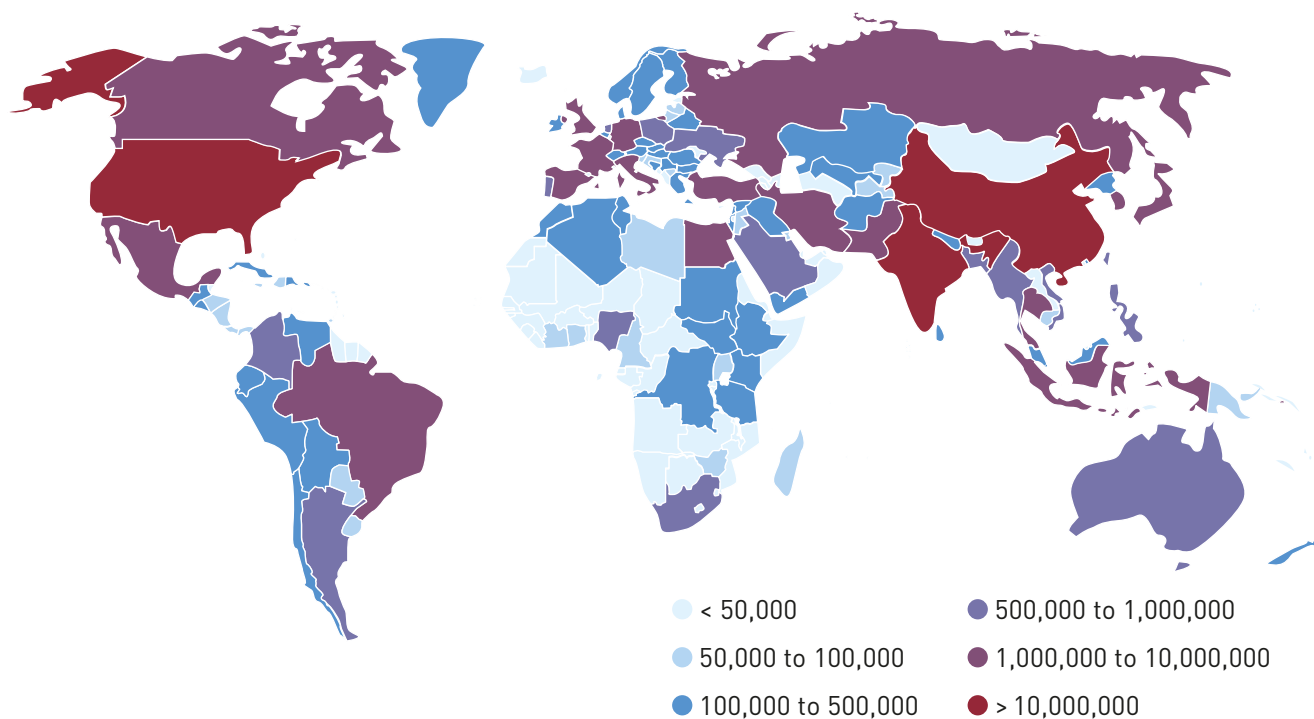
and complications need to be actively identified. Determining a person's functional ability and level of frailty, as well as a range of risks enables healthcare professionals to develop an appropriate care plan. There are a range of tests to ascertain functional and cognitive status.

The individualised care plan for an older person with diabetes must include regular screening for diabetes complications and old age-related risks and syndromes, as well as regular comprehensive reviews of the person's medications.

The way forward

Older people are a unique and growing population with diabetes for whom care must be appropriately tailored. The *IDF Guideline for Managing Diabetes in Older People* was developed in response to the lack of definitive management guidelines specific to older people. Such guidelines must be thoroughly integrated into national policies. Policy-makers must find the means to prevent diabetes and also accommodate the higher number of people requiring diabetes care, while maintaining and improving the quality of that care.

Map 6.1 Number of people with diabetes (60-79 years), 2013

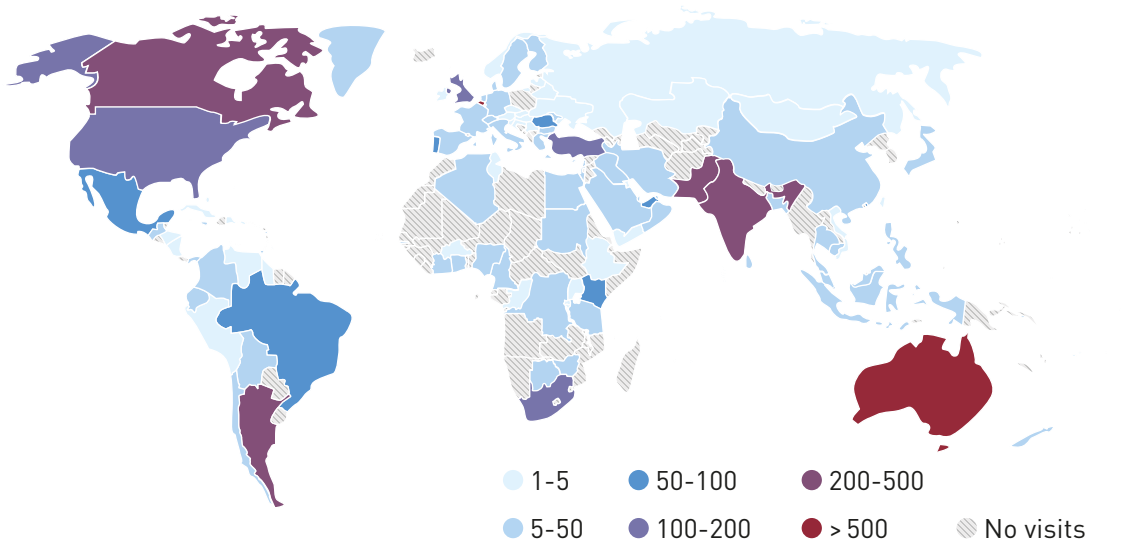


6.2 IDF programmes and campaigns

Map 6.2 Visits to D-NET, 2013

Launched in 2010, the Diabetes Education Network for Health Professionals (D-NET) is the first international online forum to enhance diabetes education and management. Health professionals

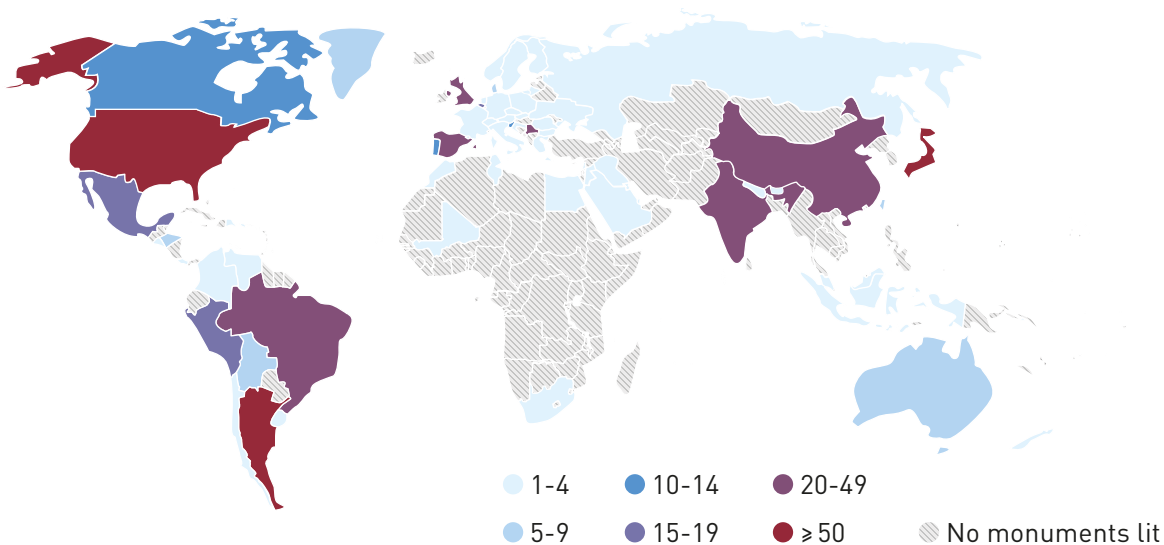
find support, share best practices, and discover learning opportunities through this dynamic network. D-NET has over 2,000 members and is still growing.



Map 6.3 Monuments lit for the 'Bring Diabetes to Light' campaign on World Diabetes Day, 2012

Held each year on 14 November, World Diabetes Day is the primary global awareness campaign of the diabetes community. One of the most dramatic displays of support is the "Bring Diabetes to Light" campaign, where monuments are lit in

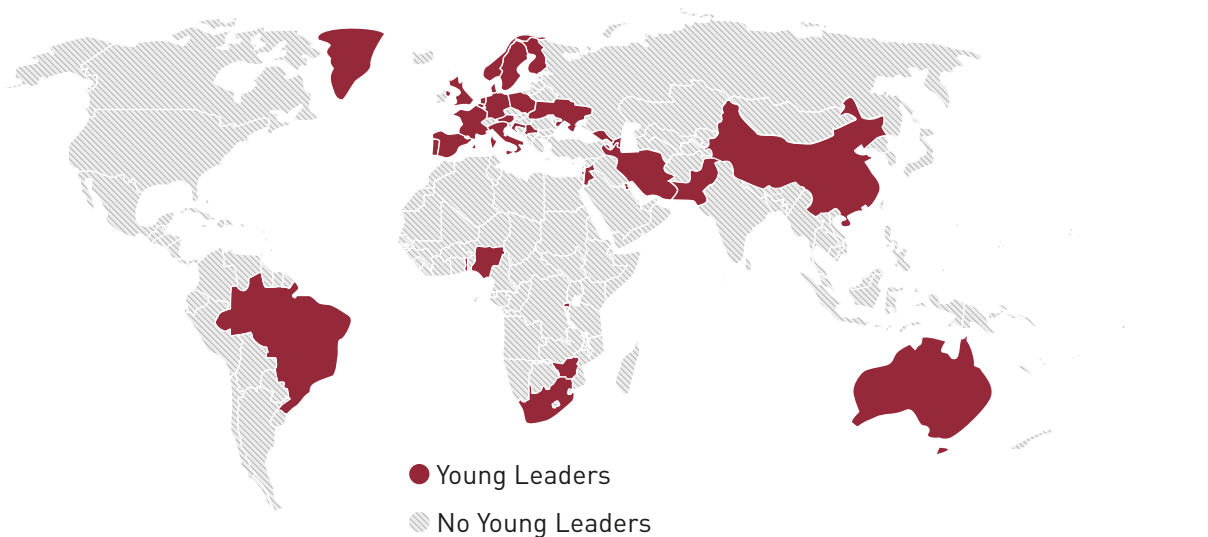
blue, the colour of the global symbol of diabetes, to commemorate World Diabetes Day. Since its inception in 2007, more than 1,000 monuments, buildings and landmarks in more than 115 countries have been lit in blue for diabetes.



Map 6.4 Young Leaders in Diabetes

IDF launched the Young Leaders in Diabetes programme in 2011 as a key driver in efforts to enhance the lives of young people living with diabetes. More than 100 Young Leaders will meet at the World

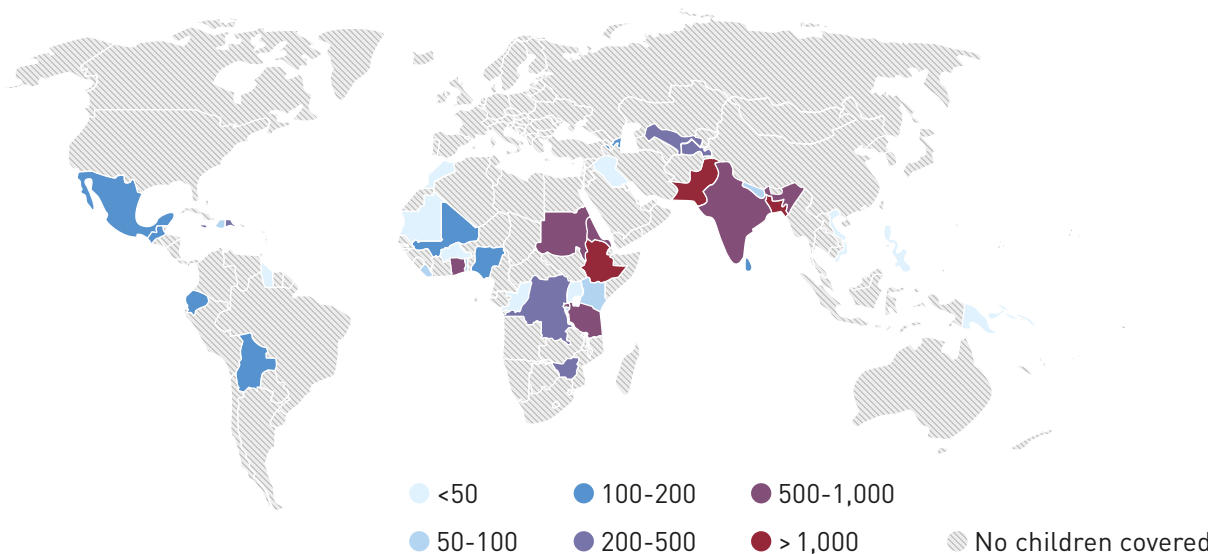
Diabetes Congress in Melbourne to share the results of projects and campaigns for young people with diabetes and plan for new ideas to improve the lives of young people living with diabetes.



Map 6.5 Children supported by the Life for a Child Programme

Lack of access to insulin remains the most common cause of death in children with diabetes. The IDF Life for a Child Programme is a support programme in which contributions from donors go to established diabetes centres to provide

ongoing clinical care, including insulin, monitoring supplies and support, and diabetes education to children with diabetes in developing countries. The programme is supporting more than 11,000 children in 43 countries.



6.3 Clinical guidelines and Position Statements

Guidelines are an essential component of achieving quality care for all people with diabetes. Guideline recommendations define standards for care, and use evidence-based interventions to achieve those standards, in order to guide health professionals, people affected by diabetes, policy-makers and administrators.

IDF guidelines and position statements have been prepared to assist countries, organisations and individuals who wish to develop their own national and regional guidelines, and draw on the experience of experts in each of the IDF Regions.

These documents are available at www.idf.org

Clinical Guidelines

CLINICAL PRACTICE GUIDELINES



The Guide for Guidelines was written for all those involved in caring for people with diabetes; for those about to prepare guidelines to assist in the delivery of diabetes care; and for those who wish to draw on the experience of others in developing such guidelines.

GLOBAL GUIDELINE FOR DIABETES IN CHILDHOOD AND ADOLESCENCE



The guideline was written to improve awareness of the serious long-term implications of poorly managed diabetes and of the essential resources needed for optimal care among governments, state healthcare providers and the general public.

MANAGEMENT OF POSTMEAL GLUCOSE



The purpose of the IDF Guideline for Management of Post-Meal Glucose is to present data from reports that describe the relationship between post-meal glucose and the development of diabetes complications. Based on these data, recommendations for the appropriate management of post-meal glucose in type 1 and type 2 diabetes have been developed.

ORAL HEALTH FOR PEOPLE WITH DIABETES



The International Diabetes Federation and the World Dental Federation came together to determine whether the evidence base in this area allowed formal recommendations on oral health and diabetes care to be made. The result of the collaboration between the two organisations is the IDF Guideline on Oral Health for People with Diabetes.

PREGNANCY AND DIABETES



This guideline deals with the means of identifying women for whom such problems are new, and helping them and women already known to have diabetes, to achieve the desired outcome of a healthy mother and baby.

PRACTICAL GUIDELINES ON THE MANAGEMENT AND PREVENTION OF THE DIABETIC FOOT



These practical guidelines are aimed at healthcare workers involved caring for people with diabetes. They present the International Consensus on the Diabetic Foot and Practical Guidelines on the Management and Prevention of the Diabetic Foot.

SELF-MONITORING OF BLOOD GLUCOSE IN NON-INSULIN TREATED TYPE 2 DIABETES



The IDF Guideline on Self-monitoring of Blood Glucose in Non-Insulin Treated Type 2 Diabetes presents a summary of findings and recommendations related to the use of self-monitoring of blood glucose in non-insulin treated people with type 2 diabetes.

TYPE 2 DIABETES



The Global Guideline for Type 2 Diabetes Update 2012 takes into account 17 specific healthcare domains and includes topics of importance and controversy. It takes a benchmark approach focusing on three levels of care: standard, minimal, and comprehensive. These can be scaled and adapted to fit the needs of different resources in different settings.

Position and Consensus Statements

A GUIDE TO NATIONAL DIABETES PROGRAMMES

The Guide to National Diabetes Programmes presents a set of practical generic frameworks and considerations covering aspects of primary prevention and diabetes care that are integral to developing and conducting comprehensive and effective responses to the crippling burden imposed by diabetes on individuals, families, communities and national governments.

ANIMAL, HUMAN AND ANALOGUE INSULINS

Insulins are now available in different molecular forms, some because of species differences and some by design through molecular engineering. There is no overwhelming evidence to prefer one species of insulin over another and people with diabetes should not change from one species of insulin to another without reason.

BARIATRIC SURGERY

The International Diabetes Federation has released its Position Statement on Bariatric Surgery. The paper calls for bariatric surgery to be considered earlier in the treatment of those who are eligible, in order to stem the serious complications that can result from diabetes.

DIABETES AND CARDIOVASCULAR DISEASE

People with diabetes are two to six times more likely to develop cardiovascular disease than people without diabetes. IDF recognises the magnitude of this problem and strongly encourages all possible collaborative measures aimed at controlling the problem.

DIABETES AND KIDNEY DISEASE

Diabetes-related kidney disease is the commonest cause worldwide of kidney failure requiring treatment by dialysis or kidney transplantation. Early kidney damage can be detected by simple urine testing. The risk of kidney failure, and the rate at which it develops, can be reduced by good control of blood glucose and blood pressure.

DIABETES AND OBESITY

Obesity and diabetes currently threaten the health, wellbeing and economic welfare of virtually every country in the world. IDF encourages those with responsibility for the provision of healthcare services to guarantee that all steps are taken to ensure that preventive measures are met.

DIABETES AND SMOKING

Tobacco is harmful to health and is of particular danger to people with diabetes. Smoking cessation has immediate positive effects. However, it is made difficult by tobacco dependence and by all forms of advertising and promotion.

DIABETES SELF-MANAGEMENT EDUCATION

IDF believes that diabetes self-management education is a critically important component of diabetes prevention and care and should be available and accessible to everyone.

INTEGRATED PREVENTION OF NCDS

This is a joint statement by the International Obesity Task Force on behalf of the International Association for the Study of Obesity, the International Diabetes Federation, the World Heart Federation, the International Union of Nutritional Sciences and the International Pediatric Association.

THE DIABETIC FOOT: AMPUTATIONS ARE PREVENTABLE

People with diabetes are at risk of neuropathy and problems with ischemia, both of which can lead to foot ulcers and slow-healing wounds. Infections in these wounds may result in amputation. IDF recommends that every person with diabetes receive the best possible foot care.

THE IDF CONSENSUS DEFINITION OF METABOLIC SYNDROME IN CHILDREN

The definition is a follow-up of the IDF Consensus Worldwide Definition of the Metabolic Syndrome. It represents a new definition to identify children and adolescents at increased risk of developing type 2 diabetes and cardiovascular disease in later life. The new definition is simple and easy to apply in clinical practice and is consistent with that developed by IDF for adults.

THE RIGHTS OF CHILDREN WITH DIABETES IN THE SCHOOL

IDF is concerned about the situation of children with diabetes, especially in their school environment. IDF holds the position that children and adolescents must be able to manage their diabetes in the school setting without being excluded or discriminated.

THE ROLE OF URINE GLUCOSE MONITORING IN DIABETES

Blood glucose self-monitoring and urine glucose self-monitoring are the primary methods used to monitor glucose levels. Urine glucose monitoring is not a substitute for blood glucose monitoring, but rather an alternative or complement that can provide very valuable information where blood glucose monitoring is not accessible, affordable, or desired.

TYPE 2 DIABETES IN YOUNG PEOPLE

The prevalence of type 2 diabetes in children and adolescents is growing worldwide, and mirrors the increase of the condition in adults. IDF recommends that provisions be made to deliver the best possible care, prevent long-term complications, and promote further research.

CONSENSUS ON TYPE 2 DIABETES PREVENTION

Early intervention and the avoidance or delay of progression to type 2 diabetes is of enormous benefit to people in terms of increasing life expectancy and quality of life, and potentially in economic terms for society and healthcare financiers.

WORLDWIDE DEFINITION OF THE METABOLIC SYNDROME

This provides health professionals with the tools to identify quickly those at risk and to compare the impact of this condition across nations and ethnic groups. The metabolic syndrome is a cluster of the most dangerous heart attack risk factors: diabetes and pre-diabetes, abdominal obesity, high cholesterol and high blood pressure.

HbA1c WORKING GROUP

The measurement of glycated haemoglobin (HbA1c) is central to good-quality diabetes care. This is a measure by which healthcare providers can relate blood glucose control to the risk of complications, such as eye damage or kidney failure. The working group was established to develop a standard and harmonise HbA1c reporting.

SLEEP APNOEA AND TYPE 2 DIABETES

Recent research demonstrates the likelihood of a relationship between type 2 diabetes and obstructive sleep apnoea. The IDF Consensus Statement on Sleep Apnoea and Type 2 diabetes raises awareness of the association between the two conditions, which has significant implications on public health.

Box 6.1 Recommendations from the 2013 WHO guidelines on diagnosing hyperglycaemia in pregnancy

Diabetes in pregnancy should be diagnosed by the 2006 WHO criteria for diabetes if one or more of the following criteria are met:

- fasting plasma glucose \geq 7.0 mmol/l (126 mg/dl)
- 2-hour plasma glucose \geq 11.1 mmol/l (200 mg/dl) following a 75 g oral glucose load
- random plasma glucose \geq 11.1 mmol/l (200 mg/dl) in the presence of diabetes symptoms

Gestational diabetes mellitus should be diagnosed at any time in pregnancy if one or more of the following criteria are met:

- fasting plasma glucose 5.1-6.9 mmol/l (92 -125 mg/dl)
- 1-hour plasma glucose \geq 10.0 mmol/l (180 mg/dl) following a 75 g oral glucose load (there are no established criteria for the diagnosis of diabetes based on the 1-hour post-load value)
- 2-hour plasma glucose 8.5-11.0 mmol/l (153 -199 mg/dl) following a 75 g oral glucose load

6.4 About the International Diabetes Federation

The International Diabetes Federation (IDF) is an umbrella organisation of over 200 national diabetes associations in more than 160 countries. It represents the interests of the growing number of people with diabetes and those at risk. The Federation has been leading the global diabetes community since 1950. IDF's mission is to promote diabetes care, prevention and a cure worldwide.

The Federation is divided into seven regions, with the aim of strengthening the work of national diabetes associations and enhancing collaboration between them. The Federation's national diabetes associations are grouped into the following seven regions: Africa (AFR), Europe (EUR), Middle East and North Africa (MENA), North America and Caribbean (NAC), South and Central America (SACA), South-East Asia (SEA) and Western Pacific (WP). The Federation's activities aim to influence policy, increase public awareness and encourage health improvement, promote the exchange of high-quality information about diabetes, and provide education for people with diabetes and their healthcare providers. IDF is associated with the Department of Public Information of the United Nations and is in official relations with the World Health Organization (WHO) and the Pan American Health Organization (PAHO).

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IDF Regions

Africa

www.idf.org/regions/africa

Europe

www.idf.org/regions/europe

Middle East and North Africa

www.idf.org/regions/middle-east-north-africa

North America and Caribbean

www.idf.org/regions/north-america-caribbean

South and Central America

www.idf.org/regions/south-central-america

South-East Asia

www.idf.org/regions/south-east-asia

Western Pacific

www.idf.org/regions/western-pacific

IDF Programmes, Advocacy, Activities and Resources

BRIDGES

www.idf.org/bridges

Diabetes Africa Foot Initiative (DAFI)

www.idf.org/diabetes-africa-foot-initiative

Diabetes Conversations

www.idf.org/node/23553

Diabetes Education

www.idf.org/education

Diabetes Education Modules

www.idf.org/diabetes-education-modules

Diabetes Score Card

www.idf.org/global-diabetes-scorecard

Diabetes Voice

www.idf.org/diabetesvoice

D-NET

www.idf.org/d-net

IDF Centres of Education

www.idf.org/idf-centres-education

IDF Multidisciplinary Diabetes Education Programme

www.idf.org/idf-multidisciplinary-diabetes-care-education-programme

IDF Young Leaders in Diabetes

youngleaders.idf.org

Life for a Child

www.idf.org/lifeforachild

Risk Prediction

www.idf.org/epidemiology/risk-prediction-tools

Recognition Programme

www.idf.org/recognition-programme-2013

Women and Diabetes

www.idf.org/women-and-diabetes

Women in India with GDM Strategy (WINGS)

www.idf.org/women-india-gdm-strategy-wings

World Diabetes Day

www.idf.org/worlddiabetesday

World Diabetes Congress

www.idf.org/worlddiabetescongress

World Health Organization

Diabetes Action Online

www.who.int/diabetesactiononline

**Diet and Physical Activity:
a public health priority**

www.who.int/dietphysicalactivity

Non-communicable diseases and mental health

www.who.int/nmh/en

WHO NCD Action Plan

www.who.int/entity/nmh/publications/ncd_action_plan_en.pdf

WHO Diabetes Programme

www.who.int/diabetes/en

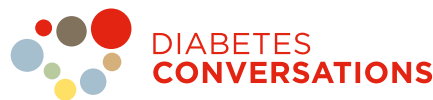
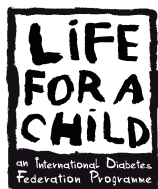
**WHO Report of the Global Survey on
the Progress in National Chronic Diseases
Prevention and Control (only in English)**

www.who.int/chp/about/integrated_cd/en/index6.html

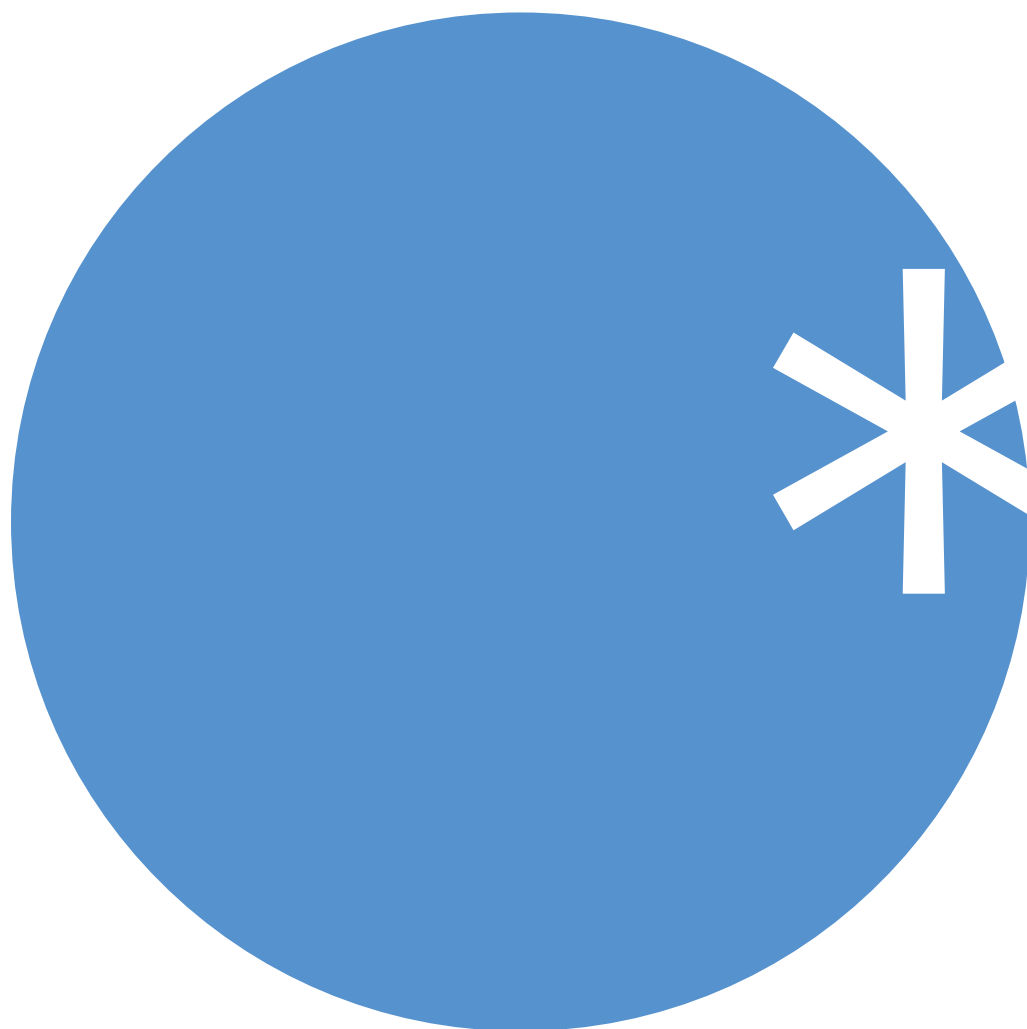
www.who.int/entity/chp/about/Report-Global-Survey-09.pdf



DiabetesVoice







Appendices and references

Country summary table:

COUNTRY/ TERRITORY	IDF REGION	Adult Population (20-79) in 1000s	Diabetes cases (20-79) in 1000s	Diabetes national prevalence (%)	Diabetes comparative prevalence (%)	Diabetes- related deaths (20-79)
Afghanistan	MENA	12,619.61	794.70	6.30*	8.27	18,864
Albania	EUR	2,155.27	60.31	2.80	2.47	833
Algeria	MENA	24,722.77	1,639.55	6.63	7.47	14,431
Andorra	EUR	59.09	4.49	7.60*	5.50	32
Angola	AFR	8,950.75	198.89	2.22	2.91	4,457
Anguilla	NAC	9.12	1.19	13.07*	12.62	-
Antigua and Barbuda	NAC	58.13	7.84	13.48*	13.26	97
Argentina	SACA	26,894.20	1,607.80	5.98	5.67	15,328
Armenia	EUR	2,082.11	54.95	2.64*	2.46	979
Aruba	NAC	73.51	12.63	17.18*	13.59	-
Australia	WP	16,504.80	1,648.86	9.99	7.77	9,765
Austria	EUR	6,365.47	589.93	9.27	6.57	4,507
Azerbaijan	EUR	6,420.69	146.34	2.28*	2.45	2,300
Bahamas	NAC	259.94	37.57	14.45*	14.16	362
Bahrain	MENA	974.96	168.66	17.30*	21.84	706
Bangladesh	SEA	92,271.61	5,089.04	5.52	6.31	102,139
Barbados	NAC	204.70	29.94	14.63	12.36	270
Belarus	EUR	7,112.19	445.25	6.26*	5.07	7,534
Belgium	EUR	7,984.75	514.82	6.45	4.77	4,160
Belize	NAC	182.10	24.43	13.42	15.88	275
Benin	AFR	4,778.10	65.63	1.37	1.58	1,221
Bermuda	NAC	45.94	6.83	14.86	12.77	-
Bhutan	SEA	461.75	22.50	4.87	5.80	124
Bolivia (Plurinational State of)	SACA	5,743.72	361.09	6.29	7.28	5,260
Bosnia and Herzegovina	EUR	2,849.99	353.43	12.40*	9.70	3,546
Botswana	AFR	1,110.54	31.74	2.86	4.12	1,118
Brazil	SACA	131,959.75	11,933.58	9.04	9.19	124,687
British Virgin Islands	NAC	18.05	2.33	12.89	12.59	-
Brunei Darussalam	WP	274.70	22.07	8.03*	8.60	237
Bulgaria	EUR	5,588.92	426.69	7.63	5.31	6,621
Burkina Faso	AFR	7,345.10	237.92	3.24*	3.75	6,265
Burundi	AFR	4,557.48	178.26	3.91	4.52	4,829

*Estimate of diabetes prevalence based on extrapolation from similar countries

estimates for 2013

Incidence type 1 diabetes (0-14) per 100,000	Mean diabetes-related expenditure per person with diabetes (USD)	IGT cases (20-79) in 1000s	IGT national prevalence (%)	IGT comparative prevalence (%)	COUNTRY/TERRITORY
-	102	772.57	6.12	7.34	Afghanistan
-	347	226.49	10.51	9.93	Albania
8.6	313	1,310.11	5.30	5.74	Algeria
-	3,237	4.89	8.27	6.65	Andorra
-	349	661.74	7.39	8.93	Angola
-	-	1.11	12.16	11.80	Anguilla
3.5	935	7.14	12.28	12.23	Antigua and Barbuda
6.8	1,174	2,342.64	8.71	8.48	Argentina
-	187	214.01	10.28	9.99	Armenia
-	-	10.33	14.06	12.13	Aruba
22.5	6,473	1,658.35	10.05	8.62	Australia
17.5	5,498	524.44	8.24	6.61	Austria
-	521	622.81	9.70	9.97	Azerbaijan
10.1	2,073	31.25	12.02	11.87	Bahamas
-	905	139.80	14.34	16.35	Bahrain
-	41	1,581.13	1.71	1.75	Bangladesh
2.0	1,156	27.08	13.23	12.06	Barbados
5.6	357	785.59	11.05	10.18	Belarus
15.9	5,487	660.33	8.27	6.67	Belgium
-	377	19.19	10.54	12.11	Belize
-	66	347.64	7.28	8.09	Benin
-	-	6.27	13.65	11.77	Bermuda
-	143	12.38	2.68	2.99	Bhutan
-	185	412.94	7.19	7.86	Bolivia (Plurinational State of)
8.2	535	312.86	10.98	9.89	Bosnia and Herzegovina
-	678	80.77	7.27	9.11	Botswana
10.4	1,477	8,151.57	6.18	6.20	Brazil
-	-	2.25	12.47	12.13	British Virgin Islands
-	1,344	29.56	10.76	10.91	Brunei Darussalam
9.4	545	126.19	2.26	1.68	Bulgaria
-	67	506.98	6.90	7.78	Burkina Faso
-	41	299.32	6.57	7.37	Burundi

Country summary table: estimates for 2013

COUNTRY/ TERRITORY	IDF REGION	Adult Population (20-79) in 1000s	Diabetes cases (20-79) in 1000s	Diabetes national prevalence (%)	Diabetes comparative prevalence (%)	Diabetes- related deaths (20-79)
Cambodia	WP	8,714.11	221.43	2.54	2.95	5,540
Cameroon	AFR	10,199.41	497.98	4.88	5.90	13,822
Canada	NAC	25,836.71	2,638.00	10.21	7.91	17,239
Cape Verde	AFR	289.36	15.85	5.48*	6.24	157
Cayman Islands	NAC	37.23	5.54	14.88*	14.31	-
Central African Republic	AFR	2,255.59	126.48	5.61*	6.32	3,934
Chad	AFR	5,169.88	231.29	4.47*	5.18	6,926
Channel Islands	EUR	121.94	9.04	7.41*	5.48	-
Chile	SACA	12,098.93	1,253.96	10.36	9.50	8,473
China	WP	1,023,050.42	98,407.38	9.62	9.02	1,271,003
Colombia	SACA	29,989.29	2,135.38	7.12	7.27	15,373
Comoros	AFR	351.11	23.74	6.76	8.38	284
Cook Islands	WP	12.11	3.08	25.40	25.66	11
Costa Rica	SACA	3,227.93	218.81	6.78	7.08	1,376
Côte d'Ivoire	AFR	9,667.49	501.53	5.19*	5.98	11,884
Croatia	EUR	3,220.08	224.49	6.97	5.60	2,182
Cuba	SACA	8,361.73	814.46	9.74*	8.10	6,770
Curaçao	NAC	112.14	20.92	18.65*	14.46	-
Cyprus	EUR	836.86	85.72	10.24	9.32	491
Czech Republic	EUR	8,190.15	755.70	9.23	6.89	7,619
Democratic People's Rep. of Korea	WP	17,246.30	1,251.66	7.26*	6.74	31,329
Democratic Republic of Congo	AFR	29,663.00	1,594.11	5.37*	6.06	33,280
Denmark	EUR	4,041.69	346.73	8.58	6.29	3,208
Djibouti	AFR	485.24	28.75	5.92*	6.83	533
Dominica	NAC	45.86	5.18	11.29*	10.90	47
Dominican Republic	SACA	6,123.91	652.87	10.66	11.35	7,175
Ecuador	SACA	9,336.56	530.13	5.68	5.91	4,539
Egypt	MENA	48,276.39	7,510.60	15.56	16.80	86,478
El Salvador	SACA	3,597.82	338.77	9.42*	10.50	3,481
Equatorial Guinea	AFR	384.40	19.16	4.98*	5.43	437
Eritrea	AFR	2,955.25	130.93	4.43*	5.17	1,720

*Estimate of diabetes prevalence based on extrapolation from similar countries

Incidence type 1 diabetes (0-14) per 100,000	Mean diabetes-related expenditure per person with diabetes (USD)	IGT cases (20-79) in 1000s	IGT national prevalence (%)	IGT comparative prevalence (%)	COUNTRY/TERRITORY
-	81	789.66	9.06	9.83	Cambodia
-	116	709.75	6.96	8.56	Cameroon
25.9	6,177	3,583.27	13.87	11.88	Canada
-	228	22.98	7.94	9.17	Cape Verde
-	-	4.53	12.16	11.80	Cayman Islands
-	30	163.52	7.25	7.96	Central African Republic
-	64	349.13	6.75	7.59	Chad
-	-	9.92	8.14	6.53	Channel Islands
6.2	1,320	1,081.78	8.94	8.49	Chile
0.6	333	54,954.56	5.37	5.16	China
1.3	606	2,506.44	8.36	8.48	Colombia
-	68	24.61	7.01	7.71	Comoros
-	708	1.30	10.70	10.82	Cook Islands
-	1,290	270.58	8.38	8.50	Costa Rica
-	133	711.42	7.36	8.52	Côte d'Ivoire
9.1	1,378	274.03	8.51	6.60	Croatia
2.3	686	801.04	9.58	8.51	Cuba
-	-	16.26	14.50	12.05	Curaçao
14.4	2,306	55.33	6.61	6.07	Cyprus
19.3	1,610	658.07	8.03	6.62	Czech Republic
-	-	1,569.47	9.10	8.75	Democratic People's Rep. of Korea
-	34	2,106.13	7.10	7.86	Democratic Republic of Congo
25.1	7,272	484.77	11.99	10.17	Denmark
-	161	41.33	8.52	9.91	Djibouti
5.7	536	5.65	12.33	11.98	Dominica
0.5	410	499.84	8.16	8.50	Dominican Republic
-	476	760.58	8.15	8.50	Ecuador
8.0	176	3,363.18	6.97	7.42	Egypt
-	351	280.40	7.79	8.46	El Salvador
-	2,009	27.71	7.21	7.78	Equatorial Guinea
-	24	197.66	6.69	7.64	Eritrea

Country summary table: estimates for 2013

COUNTRY/ TERRITORY	IDF REGION	Adult Population (20-79) in 1000s	Diabetes cases (20-79) in 1000s	Diabetes national prevalence (%)	Diabetes comparative prevalence (%)	Diabetes- related deaths (20-79)
Estonia	EUR	960.05	74.01	7.71	5.71	1,074
Ethiopia	AFR	42,487.79	1,852.23	4.36*	4.89	34,262
Faeroe Islands	EUR	36.39	2.86	7.86*	5.49	-
Federated States of Micronesia	WP	53.25	15.88	29.81	35.03	168
Fiji	WP	543.06	57.64	10.61	10.89	1,055
Finland	EUR	3,946.20	349.14	8.85	5.78	2,898
France	EUR	45,009.94	3,374.70	7.50	5.42	22,953
French Guiana	SACA	143.66	11.03	7.68*	8.12	-
French Polynesia	WP	186.85	42.35	22.67*	22.41	-
Gabon	AFR	843.40	76.59	9.08*	10.71	1,594
Gambia	AFR	800.25	12.40	1.55	1.96	205
Georgia	EUR	3,151.13	93.42	2.96*	2.45	1,481
Germany	EUR	63,281.33	7,559.78	11.95	8.27	62,460
Ghana	AFR	13,125.24	440.00	3.35*	3.83	8,529
Greece	EUR	8,336.17	584.60	7.01	4.80	4,906
Grenada	NAC	65.44	5.58	8.53*	9.44	83
Guadeloupe	NAC	314.16	24.74	7.87	6.33	-
Guam	WP	104.84	21.44	20.45*	19.48	-
Guatemala	SACA	7,369.56	661.05	8.97	10.87	7,997
Guinea	AFR	5,488.95	215.84	3.93	4.42	3,965
Guinea-Bissau	AFR	813.51	27.24	3.35*	3.81	660
Guyana	NAC	427.23	60.15	14.08*	15.86	1,098
Haiti	NAC	5,547.92	309.51	5.58	6.68	6,302
Honduras	SACA	4,278.03	268.81	6.28	7.74	2,625
Hong Kong SAR (China)	WP	5,679.94	540.02	9.51	7.48	-
Hungary	EUR	7,534.85	573.47	7.61	6.03	7,514
Iceland	EUR	226.91	8.99	3.96	3.20	60
India	SEA	760,429.73	65,076.36	8.56	9.09	1,065,053
Indonesia	WP	154,061.95	8,554.17	5.55	5.84	172,601
Iraq	MENA	16,473.21	1,226.22	7.44	9.50	17,643
Ireland	EUR	3,209.30	207.49	6.47*	5.50	1,568
Iran (Islamic Republic of)	MENA	52,145.45	4,395.93	8.43	9.94	38,002
Israel	EUR	4,769.43	317.36	6.65	5.68	2,380

*Estimate of diabetes prevalence based on extrapolation from similar countries

Incidence type 1 diabetes (0-14) per 100,000	Mean diabetes-related expenditure per person with diabetes (USD)	IGT cases (20-79) in 1000s	IGT national prevalence (%)	IGT comparative prevalence (%)	COUNTRY/TERRITORY
17.1	1,074	93.82	9.77	7.21	Estonia
0.3	29	2,915.53	6.86	7.50	Ethiopia
-	-	3.08	8.47	6.55	Faeroe Islands
-	455	3.69	6.94	7.63	Federated States of Micronesia
-	231	58.27	10.73	10.98	Fiji
57.6	4,547	391.48	9.92	6.72	Finland
12.2	5,406	3,713.58	8.25	6.66	France
-	-	12.07	8.40	8.49	French Guiana
-	-	18.80	10.06	10.01	French Polynesia
-	528	77.68	9.21	10.45	Gabon
-	50	58.23	7.28	8.29	Gambia
4.6	383	343.22	10.89	10.02	Georgia
21.9	4,718	5,682.45	8.98	6.13	Germany
-	123	863.16	6.58	7.36	Ghana
10.4	2,453	698.52	8.38	6.59	Greece
-	660	7.40	11.32	12.11	Grenada
-	-	43.41	13.82	11.91	Guadeloupe
-	-	12.58	12.00	11.49	Guam
-	336	541.90	7.35	8.47	Guatemala
-	50	395.42	7.20	7.87	Guinea
-	64	59.47	7.31	8.05	Guinea-Bissau
-	292	47.08	11.02	12.18	Guyana
-	92	222.25	4.01	4.63	Haiti
-	198	316.51	7.40	8.49	Honduras
2.0	1,678	849.58	14.96	13.30	Hong Kong SAR (China)
18.2	1,171	614.40	8.15	6.63	Hungary
14.7	4,939	17.11	7.54	6.65	Iceland
3.0	84	21,526.56	2.83	2.97	India
-	143	14,103.57	9.15	9.38	Indonesia
-	540	1,045.90	6.35	7.54	Iraq
16.3	5,598	236.74	7.38	6.60	Ireland
3.7	471	2,570.45	4.93	5.37	Iran (Islamic Republic of)
14.9	3,185	240.40	5.04	4.71	Israel

Country summary table: estimates for 2013

COUNTRY/ TERRITORY	IDF REGION	Adult Population (20-79) in 1000s	Diabetes cases (20-79) in 1000s	Diabetes national prevalence (%)	Diabetes comparative prevalence (%)	Diabetes- related deaths (20-79)
Italy	EUR	45,637.20	3,626.04	7.95	5.13	26,728
Jamaica	NAC	1,685.58	178.52	10.59	10.44	1,814
Japan	WP	95,304.38	7,203.78	7.56	5.12	64,680
Jordan	MENA	4,091.78	356.33	8.71	11.40	3,111
Kazakhstan	EUR	10,796.49	526.01	4.87*	5.01	10,932
Kenya	AFR	20,908.23	749.25	3.58	4.56	20,350
Kiribati	WP	57.95	15.03	25.94	28.77	152
Kuwait	MENA	2,293.74	407.53	17.77	23.09	1,122
Kyrgyzstan	EUR	3,271.41	164.23	5.02*	6.31	2,801
Lao People's Democratic Republic	WP	3,556.13	157.88	4.44*	5.48	4,133
Latvia	EUR	1,552.23	95.70	6.17	4.58	1,152
Lebanon	MENA	3,295.49	478.96	14.53	14.99	6,637
Lesotho	AFR	1,056.10	41.40	3.92*	4.90	2,806
Liberia	AFR	1,998.56	67.09	3.36*	3.82	1,375
Libya	MENA	3,784.70	319.13	8.43*	9.86	2,728
Liechtenstein	EUR	27.17	2.13	7.84*	5.48	14
Lithuania	EUR	2,263.70	110.95	4.90	3.89	1,731
Luxembourg	EUR	384.17	22.22	5.78	4.56	174
Macau SAR (China)	WP	452.57	42.96	9.49*	8.96	-
Macedonia, TFYR	EUR	1,567.04	184.59	11.78*	9.98	2,038
Madagascar	AFR	10,571.13	352.21	3.33*	3.77	5,298
Malawi	AFR	7,079.31	372.35	5.26	5.53	12,799
Malaysia	WP	18,919.44	1,913.24	10.11	10.85	24,049
Maldives	SEA	207.97	7.88	3.79*	4.81	98
Mali	AFR	6,418.73	81.98	1.28	1.58	1,972
Malta	EUR	327.91	33.26	10.14	6.64	268
Marshall Islands	WP	31.42	10.98	34.93	34.89	225
Martinique	NAC	281.88	52.65	18.68*	14.31	-
Mauritania	AFR	1,915.19	87.61	4.57	4.97	1,288
Mauritius	SEA	882.02	143.61	16.28	14.76	1,781
Mexico	NAC	74,137.43	8,723.42	11.77	12.63	70,281
Moldova (Republic of)	EUR	2,606.04	72.09	2.77*	2.44	1,320
Monaco	EUR	27.83	2.20	7.89*	5.51	15

*Estimate of diabetes prevalence based on extrapolation from similar countries

Incidence type 1 diabetes (0-14) per 100,000	Mean diabetes-related expenditure per person with diabetes (USD)	IGT cases (20-79) in 1000s	IGT national prevalence (%)	IGT comparative prevalence (%)	COUNTRY/TERRITORY
12.1	3,501	1,849.50	4.05	2.68	Italy
-	358	196.98	11.69	11.58	Jamaica
2.4	4,054	15,192.88	15.94	12.64	Japan
3.2	598	285.17	6.97	8.27	Jordan
-	655	1,070.96	9.92	10.01	Kazakhstan
-	61	1,742.79	8.34	9.32	Kenya
-	211	4.34	7.48	8.05	Kiribati
22.3	1,886	357.86	15.60	17.88	Kuwait
-	105	188.17	5.75	6.93	Kyrgyzstan
-	62	276.57	7.78	8.64	Lao People's Democratic Republic
7.5	1,135	175.51	11.31	10.11	Latvia
-	739	239.42	7.27	7.48	Lebanon
-	230	58.67	5.56	7.19	Lesotho
-	95	147.03	7.36	8.12	Liberia
9.0	576	305.77	8.08	9.54	Libya
-	-	2.30	8.47	6.49	Liechtenstein
14.2	1,142	248.95	11.00	10.11	Lithuania
19.0	10,206	29.64	7.72	6.64	Luxembourg
-	944	55.31	12.22	11.81	Macau SAR (China)
5.8	380	167.00	10.66	9.93	Macedonia, TFYR
-	33	747.97	7.08	7.82	Madagascar
-	54	479.66	6.78	7.48	Malawi
-	468	2,828.77	14.95	15.19	Malaysia
-	852	8.85	4.26	4.71	Maldives
-	84	452.56	7.05	7.89	Mali
21.9	1,535	28.98	8.84	6.68	Malta
-	549	2.67	8.50	8.54	Marshall Islands
-	-	41.24	14.63	12.02	Martinique
-	96	139.03	7.26	7.99	Mauritania
1.4	558	96.13	10.90	10.32	Mauritius
6.2	834	8,527.91	11.50	11.98	Mexico
-	287	275.08	10.56	9.95	Moldova (Republic of)
-	7,599	2.36	8.47	6.68	Monaco

Country summary table: estimates for 2013

COUNTRY/ TERRITORY	IDF REGION	Adult Population (20-79) in 1000s	Diabetes cases (20-79) in 1000s	Diabetes national prevalence (%)	Diabetes comparative prevalence (%)	Diabetes- related deaths (20-79)
Mongolia	WP	1,807.39	135.75	7.51	7.80	3,053
Montenegro	EUR	446.79	55.88	12.51*	10.11	680
Morocco	MENA	20,454.88	1,491.29	7.29	7.79	9,426
Mozambique	AFR	11,305.74	278.38	2.46	2.81	10,104
Myanmar	WP	34,885.26	1,988.85	5.70	6.11	60,243
Namibia	AFR	1,198.96	58.54	4.88*	6.29	1,386
Nauru	WP	6.00	1.40	23.29	23.29	22
Nepal	SEA	14,933.22	674.12	4.51	4.90	14,531
Netherlands	EUR	12,191.14	914.24	7.50	5.24	7,463
New Caledonia	WP	173.11	35.89	20.73*	19.49	-
New Zealand	WP	3,125.05	342.68	10.97	9.01	2,145
Nicaragua	SACA	3,358.99	344.31	10.25	12.45	3,308
Niger	AFR	7,058.85	306.43	4.34	4.16	5,555
Nigeria	AFR	78,628.36	3,921.50	4.99*	5.82	105,091
Niue	WP	0.76	0.10	12.79*	13.08	1
Norway	EUR	3,554.38	209.87	5.90	4.70	1,359
Oman	MENA	2,493.25	199.78	8.01	14.24	1,214
Pakistan	MENA	99,369.82	6,712.70	6.76	7.90	87,354
Palau	WP	12.49	2.32	18.55*	18.38	27
Panama	SACA	2,366.85	186.27	7.87*	8.11	1,359
Papua New Guinea	WP	3,745.41	203.70	5.44*	6.72	5,230
Paraguay	SACA	3,835.90	236.81	6.17*	7.00	2,243
Peru	SACA	18,365.03	786.26	4.28	4.53	5,407
Philippines	WP	54,210.53	3,256.21	6.01	6.86	54,535
Poland	EUR	28,907.31	1,879.69	6.50	5.21	21,329
Portugal	EUR	7,960.25	1,031.87	12.96	9.57	7,982
Puerto Rico	SACA	2,552.28	393.48	15.42	12.98	-
Qatar	MENA	1,796.42	282.53	15.73*	22.87	651
Republic of Congo	AFR	2,091.03	114.57	5.48*	6.34	2,549
Republic of Korea	WP	37,365.67	3,323.90	8.90	7.48	30,836
Réunion	AFR	570.38	93.78	16.44	15.38	-
Romania	EUR	16,554.62	851.07	5.14	4.04	12,179
Russian Federation	EUR	108,928.97	10,924.11	10.03	8.28	197,299
Rwanda	AFR	5,339.84	234.00	4.38*	5.01	5,464

*Estimate of diabetes prevalence based on extrapolation from similar countries

Incidence type 1 diabetes (0-14) per 100,000	Mean diabetes-related expenditure per person with diabetes (USD)	IGT cases (20-79) in 1000s	IGT national prevalence (%)	IGT comparative prevalence (%)	COUNTRY/TERRITORY
-	214	159.21	8.81	9.45	Mongolia
17.5	-	48.92	10.95	10.00	Montenegro
-	260	1,461.45	7.14	7.52	Morocco
-	64	808.31	7.15	7.84	Mozambique
-	32	2,944.57	8.44	8.79	Myanmar
-	447	79.04	6.59	7.80	Namibia
-	812	0.54	8.99	9.04	Nauru
-	39	305.24	2.04	2.17	Nepal
18.6	6,667	672.88	5.52	3.78	Netherlands
-	-	18.91	10.92	10.37	New Caledonia
18.0	4,040	181.78	5.82	4.72	New Zealand
-	155	394.05	11.73	12.89	Nicaragua
-	35	489.69	6.94	7.48	Niger
2.9	137	5,607.46	7.13	8.42	Nigeria
-	2,926	0.06	7.80	7.93	Niue
32.8	10,369	283.48	7.98	6.63	Norway
2.5	863	180.97	7.26	9.63	Oman
0.5	46	7,566.71	7.61	8.51	Pakistan
-	1,140	1.09	8.74	8.79	Palau
-	982	198.82	8.40	8.50	Panama
0.1	133	251.09	6.70	7.44	Papua New Guinea
0.9	545	334.65	8.72	9.57	Paraguay
0.5	426	1,489.48	8.11	8.50	Peru
-	154	3,290.58	6.07	6.61	Philippines
17.3	1,037	5,280.27	18.27	16.46	Poland
13.2	2,250	1,120.41	14.08	11.18	Portugal
16.8	-	235.71	9.24	8.48	Puerto Rico
11.4	2,199	250.18	13.93	17.09	Qatar
-	146	164.24	7.85	9.19	Republic of Congo
1.1	1,839	3,345.04	8.95	8.54	Republic of Korea
-	-	65.23	11.44	10.90	Réunion
5.4	640	1,783.64	10.77	9.91	Romania
12.1	899	11,959.48	10.98	10.19	Russian Federation
-	109	360.31	6.75	7.58	Rwanda

Country summary table: estimates for 2013

COUNTRY/ TERRITORY	IDF REGION	Adult Population (20-79) in 1000s	Diabetes cases (20-79) in 1000s	Diabetes national prevalence (%)	Diabetes comparative prevalence (%)	Diabetes- related deaths (20-79)
Saint Kitts and Nevis	NAC	34.55	4.68	13.55	12.96	63
Saint Lucia	NAC	118.27	9.88	8.35*	8.18	92
Saint Vincent and the Grenadines	NAC	70.00	6.87	9.81*	9.95	87
Samoa	WP	96.42	6.84	7.09	7.65	161
San Marino	EUR	23.46	1.78	7.59*	5.50	13
Sao Tome and Principe	AFR	92.43	4.79	5.19*	6.30	62
Saudi Arabia	MENA	18,056.84	3,650.89	20.22	23.87	22,113
Senegal	AFR	6,432.60	208.59	3.24*	3.80	3,474
Serbia	EUR	7,061.25	872.29	12.35*	9.92	10,572
Seychelles	AFR	63.52	7.75	12.20	12.14	88
Sierra Leone	AFR	2,914.75	96.15	3.30*	3.79	3,094
Singapore	WP	4,058.27	498.19	12.28	10.42	4,134
Sint Maarten (Dutch part)	NAC	28.84	4.26	14.79*	14.21	-
Slovakia	EUR	4,159.07	422.64	10.16	7.90	5,501
Slovenia	EUR	1,584.71	163.78	10.33	7.48	1,486
Solomon Islands	WP	274.13	35.51	12.96	15.59	484
Somalia	AFR	4,364.80	244.05	5.59*	6.27	5,234
South Africa	AFR	31,983.32	2,646.05	8.27	9.27	83,114
South Sudan	MENA	5,265.19	391.33	7.43*	9.13	7,268
Spain	EUR	35,007.54	3,790.77	10.83	8.15	25,202
Sri Lanka	SEA	14,033.05	1,128.01	8.04	7.60	16,276
State of Palestine	MENA	2,055.84	134.62	6.55	9.11	-
Sudan	MENA	18,119.53	1,402.22	7.74*	9.56	25,342
Suriname	NAC	338.04	36.75	10.87*	11.06	471
Swaziland	AFR	622.26	23.02	3.70*	4.64	1,378
Sweden	EUR	6,892.52	438.63	6.36	4.69	3,037
Switzerland	EUR	6,032.61	449.22	7.45	5.86	2,579
Syrian Arab Republic	MENA	11,757.75	868.83	7.39*	8.91	8,203
Taiwan	WP	17,605.38	1,721.06	9.78	8.30	-
Tajikistan	EUR	4,349.88	194.87	4.48*	6.45	2,626
Thailand	WP	49,049.75	3,150.67	6.42	5.67	66,943
Timor-Leste	WP	456.84	26.71	5.85*	7.00	615

*Estimate of diabetes prevalence based on extrapolation from similar countries

Incidence type 1 diabetes (0-14) per 100,000	Mean diabetes-related expenditure per person with diabetes (USD)	IGT cases (20-79) in 1000s	IGT national prevalence (%)	IGT comparative prevalence (%)	COUNTRY/TERRITORY
-	737	4.32	12.51	12.18	Saint Kitts and Nevis
-	665	14.70	12.43	12.28	Saint Lucia
-	416	8.34	11.91	12.05	Saint Vincent and the Grenadines
-	400	6.07	6.30	6.55	Samoa
-	4,791	1.94	8.27	6.66	San Marino
-	192	6.84	7.40	9.17	Sao Tome and Principe
31.4	943	191.35	1.06	1.29	Saudi Arabia
-	116	462.91	7.20	8.06	Senegal
12.9	680	771.48	10.93	9.95	Serbia
-	511	6.08	9.57	9.09	Seychelles
-	118	207.27	7.11	7.94	Sierra Leone
2.5	2,508	553.87	13.65	12.40	Singapore
-	-	3.52	12.19	11.84	Sint Maarten (Dutch part)
13.6	1,621	314.69	7.57	6.59	Slovakia
14.6	2,405	130.00	8.20	6.57	Slovenia
-	199	18.73	6.83	7.61	Solomon Islands
-	21	313.89	7.19	7.93	Somalia
0.8	935	2,653.94	8.30	9.03	South Africa
-	-	330.81	6.28	7.34	South Sudan
20.6	3,295	3,582.34	10.23	8.68	Spain
-	127	781.00	5.57	5.45	Sri Lanka
-	-	83.76	4.07	5.26	State of Palestine
10.1	170	1,785.75	9.86	10.82	Sudan
-	617	39.74	11.76	11.92	Suriname
-	441	32.41	5.21	6.75	Swaziland
43.2	5,806	398.80	5.79	5.42	Sweden
13.1	9,873	489.88	8.12	6.62	Switzerland
-	161	769.64	6.55	7.45	Syrian Arab Republic
3.8	1,129	2,169.81	12.32	11.19	Taiwan
1.2	87	235.10	5.40	7.17	Tajikistan
0.6	256	4,129.51	8.42	7.88	Thailand
-	90	31.74	6.95	7.73	Timor-Leste

Country summary table: estimates for 2013

COUNTRY/ TERRITORY	IDF REGION	Adult Population (20-79) in 1000s	Diabetes cases (20-79) in 1000s	Diabetes national prevalence (%)	Diabetes comparative prevalence (%)	Diabetes- related deaths (20-79)
Togo	AFR	3,234.46	130.15	4.02	4.80	2,516
Tokelau	WP	0.70	0.27	37.90	37.49	-
Tonga	WP	53.39	7.02	13.14	14.14	106
Trinidad and Tobago	NAC	952.98	132.34	13.89*	12.98	1,587
Tunisia	MENA	7,430.06	685.59	9.23	9.41	5,130
Turkey	EUR	48,294.33	7,043.29	14.58	14.85	59,786
Turkmenistan	EUR	3,205.95	129.70	4.05*	5.01	2,540
Tuvalu	WP	5.80	0.84	14.41*	14.53	15
Uganda	AFR	15,106.73	625.05	4.14*	4.84	21,461
Ukraine	EUR	34,858.02	1,043.58	2.99*	2.45	20,654
United Arab Emirates	MENA	7,443.81	745.94	10.02	18.98	1,385
United Kingdom	EUR	45,307.03	2,974.95	6.57	4.92	24,897
United Republic of Tanzania	AFR	21,870.03	1,706.93	7.80	9.00	47,144
United States of America	NAC	223,937.51	24,401.77	10.90	9.21	192,725
Uruguay	SACA	2,266.86	143.81	6.34*	5.58	1,004
US Virgin Islands	NAC	74.47	11.99	16.10	12.10	-
Uzbekistan	EUR	17,449.56	880.51	5.05	6.44	12,886
Vanuatu	WP	132.89	27.95	21.04*	23.97	360
Venezuela (Bolivarian Republic of)	SACA	18,646.42	1,232.04	6.61	6.96	9,966
Viet Nam	WP	61,387.55	3,299.11	5.37	5.81	54,953
Western Sahara	AFR	369.26	31.81	8.62*	9.19	-
Yemen	MENA	11,568.55	708.12	6.12*	8.45	9,892
Zambia	AFR	6,137.26	193.92	3.16*	3.79	7,599
Zimbabwe	AFR	6,799.80	600.67	8.83	9.73	31,347
WORLD		4,572,906.50	381,834.36	8.35	8.26	5,096,955

*Estimate of diabetes prevalence based on extrapolation from similar countries

Incidence type 1 diabetes (0-14) per 100,000	Mean diabetes-related expenditure per person with diabetes (USD)	IGT cases (20-79) in 1000s	IGT national prevalence (%)	IGT comparative prevalence (%)	COUNTRY/TERRITORY
-	74	229.43	7.09	7.95	Togo
-	-	0.06	9.01	9.02	Tokelau
-	307	3.94	7.37	7.85	Tonga
-	1,121	121.19	12.72	12.28	Trinidad and Tobago
7.3	347	552.49	7.44	7.54	Tunisia
-	866	3,668.10	7.60	7.62	Turkey
-	203	296.04	9.23	9.93	Turkmenistan
-	816	0.47	8.06	8.14	Tuvalu
-	79	998.85	6.61	7.46	Uganda
8.1	314	3,864.70	11.09	10.14	Ukraine
-	2,228	934.30	12.55	16.63	United Arab Emirates
28.2	3,994	3,686.07	8.14	6.63	United Kingdom
0.9	63	1,985.78	9.08	10.29	United Republic of Tanzania
23.7	9,800	31,224.12	13.94	12.37	United States of America
8.3	1,358	207.29	9.14	8.48	Uruguay
12.8	-	11.11	14.91	11.95	US Virgin Islands
1.2	128	993.18	5.69	6.92	Uzbekistan
-	175	9.38	7.06	7.69	Vanuatu
0.1	808	1,537.79	8.25	8.49	Venezuela (Bolivarian Republic of)
-	128	564.80	0.92	1.00	Viet Nam
-	-	28.53	7.73	8.67	Western Sahara
-	151	683.34	5.91	7.41	Yemen
0.8	161	427.69	6.97	7.93	Zambia
-	54	389.13	5.72	5.48	Zimbabwe
	1,436	316,506.51	6.92	6.87	WORLD

Country details table:

COUNTRY/ TERRITORY	IDF REGION	Number of people with diabetes (20-79) in 1000s, Male	Number of people with diabetes (20-79) in 1000s, Female	Number of people with diabetes (20-79) in 1000s, Rural setting	Number of people with diabetes (20-79) in 1000s, Urban setting
Afghanistan	MENA	403.38	391.33	566.12	228.59
Albania	EUR	29.68	30.63	26.09	34.22
Algeria	MENA	817.90	821.64	290.18	1,349.37
Andorra	EUR	2.26	2.23	0.62	3.87
Angola	AFR	95.62	103.27	48.55	150.34
Anguilla	NAC	0.58	0.61	-	1.19
Antigua and Barbuda	NAC	3.21	4.62	5.31	2.52
Argentina	SACA	759.16	848.64	115.66	1,492.14
Armenia	EUR	25.84	29.11	19.08	35.88
Aruba	NAC	4.85	7.77	6.42	6.21
Australia	WP	894.25	754.61	173.22	1,475.64
Austria	EUR	288.10	301.83	167.72	422.21
Azerbaijan	EUR	65.60	80.73	65.42	80.92
Bahamas	NAC	14.35	23.22	5.25	32.32
Bahrain	MENA	105.07	63.59	8.51	160.14
Bangladesh	SEA	2,536.03	2,553.01	2,036.03	3,053.02
Barbados	NAC	12.71	17.23	16.34	13.60
Belarus	EUR	196.72	248.52	103.71	341.53
Belgium	EUR	249.09	265.73	10.66	504.16
Belize	NAC	7.59	16.85	13.31	11.12
Benin	AFR	31.96	33.67	26.53	39.11
Bermuda	NAC	3.31	3.52	-	6.83
Bhutan	SEA	13.30	9.20	10.39	12.11
Bolivia (Plurinational State of)	SACA	166.54	194.54	116.71	244.38
Bosnia and Herzegovina	EUR	155.68	197.75	154.27	199.17
Botswana	AFR	10.30	21.45	7.21	24.53
Brazil	SACA	5,778.01	6,155.56	1,770.18	10,163.40
British Virgin Islands	NAC	1.13	1.19	1.34	0.98
Brunei Darussalam	WP	12.06	10.01	4.38	17.69
Bulgaria	EUR	192.04	234.64	133.38	293.31
Burkina Faso	AFR	116.40	121.53	172.36	65.56
Burundi	AFR	96.06	82.19	132.53	45.72
Cambodia	WP	99.20	122.22	136.58	84.84
Cameroon	AFR	251.66	246.32	151.87	346.10
Canada	NAC	1,415.66	1,222.33	504.05	2,133.95

estimates for 2013

Number of people with diabetes (20-39) in 1000s	Number of people with diabetes (40-59) in 1000s	Number of people with diabetes (60-79) in 1000s	Number of people with undiagnosed diabetes (20-79) in 1000s	COUNTRY/TERRITORY
183.24	404.20	207.26	397.35	Afghanistan
8.36	24.93	27.03	21.15	Albania
527.91	720.73	390.90	819.77	Algeria
0.24	1.61	2.64	1.64	Andorra
38.90	121.71	38.28	91.49	Angola
0.24	0.51	0.44	0.30	Anguilla
0.99	4.32	2.52	2.17	Antigua and Barbuda
224.55	757.18	626.07	386.68	Argentina
8.81	23.49	22.65	19.27	Armenia
1.12	6.27	5.24	3.50	Aruba
62.83	601.95	984.08	814.54	Australia
32.17	181.26	376.51	215.86	Austria
29.91	72.33	44.10	51.31	Azerbaijan
6.04	18.34	13.20	10.41	Bahamas
52.13	99.30	17.23	68.64	Bahrain
1,022.53	3,178.14	888.36	2,218.82	Bangladesh
2.27	15.21	12.46	8.30	Barbados
33.48	191.70	220.07	156.10	Belarus
37.81	186.91	290.11	188.37	Belgium
8.22	10.91	5.29	6.11	Belize
25.82	28.33	11.48	49.28	Benin
1.16	2.85	2.82	1.89	Bermuda
7.16	10.09	5.25	11.04	Bhutan
52.80	182.99	125.30	86.84	Bolivia (Plurinational State of)
27.44	149.02	176.97	123.91	Bosnia and Herzegovina
4.65	14.38	12.72	14.60	Botswana
1,687.93	5,435.75	4,809.90	2,870.03	Brazil
0.68	0.94	0.71	0.58	British Virgin Islands
2.27	12.84	6.96	10.90	Brunei Darussalam
16.62	150.41	259.65	149.60	Bulgaria
109.83	92.57	35.52	178.65	Burkina Faso
85.59	70.01	22.65	133.84	Burundi
44.91	118.74	57.77	139.59	Cambodia
187.92	216.16	93.90	229.07	Cameroon
183.58	1,076.88	1,377.54	730.99	Canada

Country details table: estimates for 2013

COUNTRY/ TERRITORY	IDF REGION	Number of people with diabetes (20-79) in 1000s, Male	Number of people with diabetes (20-79) in 1000s, Female	Number of people with diabetes (20-79) in 1000s, Rural setting	Number of people with diabetes (20-79) in 1000s, Urban setting
Cape Verde	AFR	7.88	7.97	3.46	12.39
Cayman Islands	NAC	2.15	3.39	-	5.54
Central African Republic	AFR	64.27	62.21	45.59	80.89
Chad	AFR	122.24	109.05	131.79	99.49
Channel Islands	EUR	4.80	4.24	6.18	2.86
Chile	SACA	560.15	693.80	130.43	1,123.52
China	WP	55,554.44	42,852.94	39,101.87	59,305.51
Colombia	SACA	1,097.35	1,038.03	515.75	1,619.63
Comoros	AFR	11.69	12.05	14.17	9.57
Cook Islands	WP	1.70	1.38	0.80	2.28
Costa Rica	SACA	117.40	101.41	58.33	160.48
Côte d'Ivoire	AFR	269.83	231.70	154.96	346.57
Croatia	EUR	105.94	118.56	84.58	139.92
Cuba	SACA	424.14	390.32	183.49	630.97
Curaçao	NAC	7.07	13.85	1.19	19.72
Cyprus	EUR	59.23	26.49	22.13	63.59
Czech Republic	EUR	381.83	373.87	177.46	578.24
Democratic People's Rep. of Korea	WP	549.91	701.75	264.34	987.32
Democratic Republic of Congo	AFR	824.61	769.50	643.55	950.56
Denmark	EUR	189.82	156.91	38.25	308.48
Djibouti	AFR	14.62	14.13	3.70	25.05
Dominica	NAC	2.37	2.81	1.14	4.04
Dominican Republic	SACA	322.20	330.67	190.35	462.52
Ecuador	SACA	260.67	269.46	166.25	363.88
Egypt	MENA	3,201.59	4,309.02	3,006.79	4,503.81
El Salvador	SACA	144.69	194.08	115.97	222.81
Equatorial Guinea	AFR	10.22	8.94	8.25	10.91
Eritrea	AFR	67.29	63.64	73.89	57.04
Estonia	EUR	34.77	39.25	20.00	54.01
Ethiopia	AFR	991.67	860.56	1,176.20	676.04
Faeroe Islands	EUR	1.48	1.37	1.67	1.19
Fed. States of Micronesia	WP	7.65	8.22	12.06	3.82
Fiji	WP	26.80	30.84	24.37	33.27

Number of people with diabetes (20-39) in 1000s	Number of people with diabetes (40-59) in 1000s	Number of people with diabetes (60-79) in 1000s	Number of people with undiagnosed diabetes (20-79) in 1000s	COUNTRY/TERRITORY
5.26	7.80	2.79	7.29	Cape Verde
0.90	2.51	2.13	1.54	Cayman Islands
55.84	49.20	21.44	94.97	Central African Republic
109.92	88.80	32.57	173.66	Chad
0.50	3.40	5.14	3.31	Channel Islands
127.72	628.50	497.74	301.58	Chile
13,389.06	48,464.36	36,553.96	53,238.39	China
369.40	1,216.48	549.50	513.56	Colombia
4.87	13.98	4.90	17.82	Comoros
0.85	1.49	0.74	1.52	Cook Islands
32.93	102.03	83.86	52.62	Costa Rica
170.66	231.54	99.34	230.70	Côte d'Ivoire
27.89	99.00	97.61	82.14	Croatia
76.39	374.34	363.73	195.88	Cuba
1.92	9.66	9.33	5.80	Curaçao
11.28	38.91	35.53	31.37	Cyprus
43.72	259.20	452.78	276.51	Czech Republic
188.53	614.55	448.58	789.05	Democratic People's Rep. of Korea
696.25	654.10	243.76	1,196.94	Democratic Republic of Congo
25.80	123.77	197.16	126.87	Denmark
9.97	13.45	5.33	13.22	Djibouti
0.99	2.29	1.91	1.29	Dominica
133.25	311.23	208.39	157.02	Dominican Republic
157.00	265.44	107.68	127.50	Ecuador
1,692.84	3,636.10	2,181.67	3,755.30	Egypt
59.42	166.68	112.68	81.47	El Salvador
5.37	10.87	2.91	8.81	Equatorial Guinea
65.51	49.16	16.26	98.31	Eritrea
5.52	25.15	43.34	27.08	Estonia
818.47	731.81	301.96	1,390.75	Ethiopia
0.13	1.01	1.72	1.05	Faeroe Islands
3.65	8.04	4.18	8.59	Fed. States of Micronesia
8.42	33.36	15.86	31.18	Fiji

Country details table: estimates for 2013

COUNTRY/ TERRITORY	IDF REGION	Number of people with diabetes (20-79) in 1000s, Male	Number of people with diabetes (20-79) in 1000s, Female	Number of people with diabetes (20-79) in 1000s, Rural setting	Number of people with diabetes (20-79) in 1000s, Urban setting
Finland	EUR	200.29	148.85	48.66	300.48
France	EUR	1,801.47	1,573.23	295.95	3,078.74
French Guiana	SACA	5.82	5.21	2.36	8.67
French Polynesia	WP	21.91	20.44	20.58	21.77
Gabon	AFR	28.09	48.50	2.28	74.31
Gambia	AFR	6.80	5.60	3.71	8.69
Georgia	EUR	41.46	51.96	42.77	50.65
Germany	EUR	3,772.12	3,787.65	1,720.73	5,839.05
Ghana	AFR	223.21	216.80	206.05	233.95
Greece	EUR	261.06	323.54	196.17	388.43
Grenada	NAC	2.39	3.19	2.58	3.01
Guadeloupe	NAC	10.15	14.59	0.38	24.36
Guam	WP	11.55	9.90	1.45	20.00
Guatemala	SACA	314.63	346.42	326.14	334.91
Guinea	AFR	120.06	95.77	132.38	83.46
Guinea-Bissau	AFR	14.04	13.20	14.92	12.32
Guyana	NAC	18.17	41.98	42.37	17.78
Haiti	NAC	115.30	194.21	116.23	193.28
Honduras	SACA	140.42	128.39	125.56	143.25
Hong Kong SAR (China)	WP	259.03	280.99	-	540.02
Hungary	EUR	350.06	223.41	180.91	392.56
Iceland	EUR	5.92	3.07	0.46	8.53
India	SEA	34,516.82	30,559.54	34,505.06	30,571.31
Indonesia	WP	3,616.13	4,938.03	3,933.89	4,620.28
Iraq	MENA	554.43	671.79	255.84	970.38
Ireland	EUR	110.24	97.25	76.92	130.57
Iran (Islamic Republic of)	MENA	1,970.31	2,425.62	1,036.73	3,359.19
Israel	EUR	168.64	148.72	21.84	295.52
Italy	EUR	1,769.85	1,856.19	1,009.91	2,616.12
Jamaica	NAC	74.62	103.90	68.86	109.66
Japan	WP	4,592.68	2,611.09	543.28	6,660.50
Jordan	MENA	181.41	174.92	54.49	301.84
Kazakhstan	EUR	242.82	283.18	238.81	287.20
Kenya	AFR	428.59	320.66	478.82	270.43
Kiribati	WP	7.63	7.40	8.12	6.91
Kuwait	MENA	249.37	158.15	3.03	404.50
Kyrgyzstan	EUR	120.95	43.28	97.71	66.52

Number of people with diabetes (20-39) in 1000s	Number of people with diabetes (40-59) in 1000s	Number of people with diabetes (60-79) in 1000s	Number of people with undiagnosed diabetes (20-79) in 1000s	COUNTRY/TERRITORY
9.49	107.27	232.37	127.75	Finland
114.51	1,325.38	1,934.81	1,234.80	France
1.71	5.62	3.70	2.65	French Guiana
11.64	21.08	9.63	20.92	French Polynesia
14.08	31.37	31.14	35.23	Gabon
3.61	7.26	1.53	9.31	Gambia
11.83	36.39	45.20	32.75	Georgia
606.63	2,330.36	4,622.79	2,766.12	Germany
165.00	199.49	75.51	330.38	Ghana
20.79	184.23	379.58	213.91	Greece
1.32	2.43	1.83	1.40	Grenada
1.85	12.66	10.22	6.18	Guadeloupe
4.84	10.35	6.26	10.59	Guam
157.12	295.82	208.11	158.98	Guatemala
90.93	77.46	47.45	162.06	Guinea
10.84	11.33	5.07	20.45	Guinea-Bissau
18.02	29.48	12.64	15.04	Guyana
60.17	154.20	95.14	91.00	Haiti
53.64	151.45	63.72	64.65	Honduras
30.09	242.38	267.54	266.77	Hong Kong SAR (China)
47.08	250.76	275.63	209.83	Hungary
0.45	3.28	5.27	3.29	Iceland
12,913.16	36,733.17	15,430.03	31,919.96	India
1,671.88	4,651.55	2,230.73	4,627.80	Indonesia
328.71	559.82	337.69	613.11	Iraq
15.79	80.66	111.04	75.92	Ireland
912.75	2,267.73	1,215.45	2,197.96	Iran (Islamic Republic of)
13.20	106.46	197.71	116.12	Israel
76.83	1,069.01	2,480.19	1,326.77	Italy
24.60	86.54	67.38	44.63	Jamaica
381.67	2,370.73	4,451.38	3,558.67	Japan
68.82	194.75	92.76	178.17	Jordan
60.58	253.66	211.76	184.42	Kazakhstan
241.21	378.07	129.97	562.57	Kenya
4.13	7.72	3.18	8.13	Kiribati
145.54	210.05	51.94	165.86	Kuwait
7.54	100.09	56.60	48.19	Kyrgyzstan

Country details table: estimates for 2013

COUNTRY/ TERRITORY	IDF REGION	Number of people with diabetes (20-79) in 1000s, Male	Number of people with diabetes (20-79) in 1000s, Female	Number of people with diabetes (20-79) in 1000s, Rural setting	Number of people with diabetes (20-79) in 1000s, Urban setting
Lao People's Democratic Republic	WP	75.02	82.86	65.96	91.92
Latvia	EUR	35.48	60.22	29.94	65.76
Lebanon	MENA	240.47	238.49	33.28	445.68
Lesotho	AFR	19.80	21.61	22.78	18.62
Liberia	AFR	34.76	32.33	34.24	32.85
Libya	MENA	142.14	177.00	52.16	266.97
Liechtenstein	EUR	1.12	1.01	1.82	0.31
Lithuania	EUR	45.70	65.26	35.06	75.89
Luxembourg	EUR	12.70	9.51	2.72	19.50
Macau SAR (China)	WP	21.60	21.37	-	42.96
Macedonia, TFYR	EUR	84.61	99.98	62.33	122.26
Madagascar	AFR	179.52	172.69	233.12	119.09
Malawi	AFR	223.38	148.97	280.98	91.37
Malaysia	WP	936.71	976.53	468.46	1,444.77
Maldives	SEA	4.12	3.76	3.14	4.75
Mali	AFR	39.37	42.62	41.54	40.44
Malta	EUR	14.11	19.15	1.38	31.89
Marshall Islands	WP	4.93	6.05	2.87	8.11
Martinique	NAC	18.71	33.94	5.34	47.31
Mauritania	AFR	40.61	47.00	39.10	48.50
Mauritius	SEA	71.16	72.44	69.58	74.02
Mexico	NAC	3,764.03	4,959.38	1,791.81	6,931.61
Moldova (Republic of)	EUR	31.91	40.18	35.83	36.26
Monaco	EUR	1.11	1.08	-	2.20
Mongolia	WP	88.69	47.06	38.25	97.50
Montenegro	EUR	24.78	31.10	16.76	39.12
Morocco	MENA	715.12	776.17	411.24	1,080.05
Mozambique	AFR	128.59	149.79	105.45	172.93
Myanmar	WP	929.88	1,058.97	888.46	1,100.38
Namibia	AFR	18.14	40.40	14.19	44.35
Nauru	WP	0.63	0.76	-	1.40
Nepal	SEA	484.14	189.98	430.10	244.02
Netherlands	EUR	465.18	449.05	127.33	786.90
New Caledonia	WP	19.41	16.48	13.85	22.04
New Zealand	WP	191.95	150.73	46.94	295.73
Nicaragua	SACA	157.92	186.39	143.99	200.32

Number of people with diabetes (20-39) in 1000s	Number of people with diabetes (40-59) in 1000s	Number of people with diabetes (60-79) in 1000s	Number of people with undiagnosed diabetes (20-79) in 1000s	COUNTRY/TERRITORY
42.86	70.17	44.86	99.53	Lao People's Democratic Republic
6.99	34.14	54.57	33.55	Latvia
51.07	208.02	219.88	239.48	Lebanon
16.77	15.90	8.73	19.04	Lesotho
25.94	29.63	11.52	50.37	Liberia
72.35	159.06	87.72	159.57	Libya
0.10	0.74	1.28	0.78	Liechtenstein
7.56	43.64	59.76	38.90	Lithuania
0.87	8.91	12.44	8.13	Luxembourg
3.30	23.01	16.66	21.22	Macau SAR (China)
17.90	81.99	84.70	64.72	Macedonia, TFYR
147.65	149.48	55.08	264.46	Madagascar
219.99	107.47	44.90	279.58	Malawi
473.84	980.19	459.20	1,035.06	Malaysia
1.48	4.00	2.39	3.87	Maldives
30.30	30.88	20.80	61.56	Mali
0.34	10.13	22.80	12.17	Malta
2.29	5.96	2.72	5.94	Marshall Islands
4.48	23.68	24.49	14.59	Martinique
38.25	38.61	10.75	65.78	Mauritania
18.88	75.20	49.53	70.44	Mauritius
1,006.87	4,426.54	3,290.00	2,180.85	Mexico
10.36	29.72	32.02	25.27	Moldova (Republic of)
0.10	0.79	1.31	0.80	Monaco
57.81	65.81	12.13	73.44	Mongolia
4.95	24.18	26.75	19.59	Montenegro
325.83	825.75	339.70	745.64	Morocco
112.58	130.61	35.19	209.02	Mozambique
447.53	1,011.57	529.75	1,253.77	Myanmar
12.96	27.14	18.43	26.93	Namibia
0.32	0.74	0.34	0.76	Nauru
149.67	313.90	210.55	293.92	Nepal
43.80	291.02	579.42	334.52	Netherlands
8.05	16.72	11.12	17.73	New Caledonia
37.00	139.28	166.39	169.28	New Zealand
67.40	183.39	93.52	82.81	Nicaragua

Country details table: estimates for 2013

COUNTRY/ TERRITORY	IDF REGION	Number of people with diabetes (20-79) in 1000s, Male	Number of people with diabetes (20-79) in 1000s, Female	Number of people with diabetes (20-79) in 1000s, Rural setting	Number of people with diabetes (20-79) in 1000s, Urban setting
Niger	AFR	178.77	127.66	221.25	85.17
Nigeria	AFR	1,997.77	1,923.73	1,276.70	2,644.80
Niue	WP	0.05	0.05	0.04	0.06
Norway	EUR	122.48	87.39	36.76	173.11
Oman	MENA	124.29	75.49	33.02	166.76
Pakistan	MENA	3,458.53	3,254.17	3,777.94	2,934.76
Palau	WP	1.10	1.22	0.16	2.16
Panama	SACA	97.01	89.26	39.83	146.44
Papua New Guinea	WP	107.25	96.45	170.96	32.74
Paraguay	SACA	111.01	125.80	87.65	149.17
Peru	SACA	387.35	398.91	173.36	612.90
Philippines	WP	1,547.14	1,709.07	1,245.28	2,010.93
Poland	EUR	933.55	946.14	716.36	1,163.32
Portugal	EUR	594.42	437.45	351.25	680.61
Puerto Rico	SACA	165.66	227.82	3.57	389.91
Qatar	MENA	221.43	61.10	1.16	281.37
Republic of Congo	AFR	57.81	56.77	24.70	89.88
Republic of Korea	WP	1,785.68	1,538.23	539.43	2,784.47
Réunion	AFR	43.47	50.31	2.54	91.24
Romania	EUR	336.08	514.99	391.21	459.86
Russian Federation	EUR	4,534.58	6,389.53	2,721.27	8,202.84
Rwanda	AFR	120.01	113.99	140.53	93.47
Saint Kitts and Nevis	NAC	1.53	3.15	3.18	1.50
Saint Lucia	NAC	3.86	6.02	7.43	2.44
Saint Vincent and the Grenadines	NAC	3.14	3.73	2.51	4.36
Samoa	WP	3.15	3.69	4.87	1.97
San Marino	EUR	0.90	0.88	0.10	1.68
Sao Tome and Principe	AFR	2.30	2.50	1.05	3.74
Saudi Arabia	MENA	2,252.20	1,398.69	275.91	3,374.98
Senegal	AFR	102.27	106.32	120.27	88.33
Serbia	EUR	387.10	485.18	314.84	557.45
Seychelles	AFR	3.63	4.12	2.29	5.46
Sierra Leone	AFR	49.30	46.85	57.87	38.28
Singapore	WP	255.57	242.62	-	498.19

Number of people with diabetes (20-39) in 1000s	Number of people with diabetes (40-59) in 1000s	Number of people with diabetes (60-79) in 1000s	Number of people with undiagnosed diabetes (20-79) in 1000s	COUNTRY/TERRITORY
201.88	87.83	16.71	230.08	Niger
1,407.69	1,806.00	707.81	1,803.89	Nigeria
0.02	0.06	0.02	0.05	Niue
19.46	85.29	105.12	76.79	Norway
73.54	91.93	34.31	81.31	Oman
1,804.49	3,331.06	1,577.15	3,356.35	Pakistan
0.39	1.36	0.56	1.25	Palau
29.70	86.09	70.48	44.80	Panama
50.93	100.32	52.45	110.20	Papua New Guinea
42.46	118.24	76.11	56.95	Paraguay
202.20	378.86	205.19	189.09	Peru
709.06	1,670.97	876.18	1,761.61	Philippines
142.40	765.91	971.37	659.02	Poland
75.88	378.52	577.47	377.56	Portugal
37.97	163.50	192.01	109.03	Puerto Rico
119.55	147.67	15.31	114.99	Qatar
41.13	52.30	21.14	52.70	Republic of Congo
315.74	1,664.13	1,344.04	1,642.01	Republic of Korea
10.37	49.98	33.43	43.14	Réunion
41.56	327.99	481.51	298.38	Romania
750.47	5,077.50	5,096.14	3,829.99	Russian Federation
113.14	90.68	30.18	175.70	Rwanda
0.60	2.13	1.95	1.30	Saint Kitts and Nevis
1.68	4.86	3.34	2.47	Saint Lucia
1.41	3.28	2.17	1.72	Saint Vincent and the Grenadines
0.61	3.73	2.50	3.70	Samoa
0.09	0.64	1.04	0.65	San Marino
1.90	2.11	0.79	2.21	Sao Tome and Principe
1,147.24	1,950.45	553.21	1,485.91	Saudi Arabia
88.75	84.78	35.07	156.62	Senegal
78.62	363.13	430.54	305.82	Serbia
0.81	4.34	2.59	3.57	Seychelles
40.64	40.25	15.25	72.19	Sierra Leone
34.54	252.92	210.73	246.11	Singapore

Country details table: estimates for 2013

COUNTRY/ TERRITORY	IDF REGION	Number of people with diabetes (20-79) in 1000s, Male	Number of people with diabetes (20-79) in 1000s, Female	Number of people with diabetes (20-79) in 1000s, Rural setting	Number of people with diabetes (20-79) in 1000s, Urban setting
Sint Maarten (Dutch part)	NAC	1.67	2.60	0.24	4.02
Slovakia	EUR	189.90	232.73	174.64	247.99
Slovenia	EUR	74.17	89.60	75.43	88.35
Solomon Islands	WP	20.51	15.00	27.48	8.03
Somalia	AFR	125.64	118.41	90.31	153.74
South Africa	AFR	927.87	1,718.18	505.55	2,140.50
South Sudan	MENA	160.29	231.03	302.71	88.61
Spain	EUR	2,125.42	1,665.35	741.59	3,049.18
Sri Lanka	SEA	577.30	550.71	797.89	330.11
State of Palestine	MENA	55.47	79.14	34.42	100.20
Sudan	MENA	589.41	812.81	848.04	554.19
Suriname	NAC	16.98	19.77	7.22	29.53
Swaziland	AFR	11.18	11.84	14.99	8.03
Sweden	EUR	262.15	176.47	55.02	383.60
Switzerland	EUR	218.83	230.38	103.85	345.37
Syrian Arab Republic	MENA	431.68	437.15	326.37	542.46
Taiwan	WP	1,017.49	703.58	806.72	914.34
Tajikistan	EUR	148.39	46.48	133.86	61.01
Thailand	WP	1,357.77	1,792.90	2,002.47	1,148.20
Timor-Leste	WP	14.00	12.71	17.49	9.22
Togo	AFR	86.86	43.28	62.09	68.05
Tokelau	WP	0.13	0.13	-	0.27
Tonga	WP	3.29	3.73	5.26	1.75
Trinidad and Tobago	NAC	57.51	74.82	111.75	20.59
Tunisia	MENA	299.15	386.44	126.69	558.90
Turkey	EUR	3,054.67	3,988.62	1,627.42	5,415.87
Turkmenistan	EUR	64.05	65.65	64.06	65.64
Tuvalu	WP	0.40	0.44	0.24	0.59
Uganda	AFR	335.35	289.69	409.77	215.27
Ukraine	EUR	438.13	605.45	309.77	733.81
United Arab Emirates	MENA	520.43	225.51	70.31	675.63
United Kingdom	EUR	1,744.47	1,230.48	524.37	2,450.59
United Republic of Tanzania	AFR	867.11	839.82	1,031.14	675.79
United States of America	NAC	12,070.19	12,331.58	4,188.12	20,213.64

Number of people with diabetes (20-39) in 1000s	Number of people with diabetes (40-59) in 1000s	Number of people with diabetes (60-79) in 1000s	Number of people with undiagnosed diabetes (20-79) in 1000s	COUNTRY/TERRITORY
0.68	1.94	1.64	1.18	Sint Maarten (Dutch part)
7.25	135.03	280.35	154.64	Slovakia
7.35	61.54	94.89	59.93	Slovenia
9.71	18.04	7.77	19.21	Solomon Islands
104.58	100.83	38.64	183.25	Somalia
550.98	1,188.33	906.74	1,217.18	South Africa
99.23	190.31	101.79	195.66	South Sudan
154.03	1,431.01	2,205.73	1,387.04	Spain
238.02	554.41	335.58	553.29	Sri Lanka
14.71	84.25	35.65	67.31	State of Palestine
349.94	709.83	342.45	701.11	Sudan
7.88	17.25	11.63	9.19	Suriname
8.85	9.58	4.59	10.59	Swaziland
30.58	152.00	256.04	160.49	Sweden
51.06	165.12	233.03	164.37	Switzerland
172.60	461.45	234.78	434.41	Syrian Arab Republic
150.53	766.63	803.90	850.20	Taiwan
9.71	116.31	68.84	57.17	Tajikistan
326.18	1,641.56	1,182.93	1,704.51	Thailand
5.78	12.08	8.84	14.45	Timor-Leste
54.36	48.98	26.80	97.72	Togo
0.07	0.15	0.05	0.14	Tokelau
1.65	3.67	1.71	3.80	Tonga
16.34	64.06	51.93	36.67	Trinidad and Tobago
107.72	375.85	202.02	342.80	Tunisia
1,143.29	3,383.37	2,516.63	2,469.38	Turkey
19.63	67.99	42.08	45.47	Turkmenistan
0.15	0.48	0.21	0.45	Tuvalu
305.43	234.77	84.84	469.32	Uganda
135.00	398.52	510.05	365.88	Ukraine
461.46	253.64	30.84	303.60	United Arab Emirates
203.52	1,051.53	1,719.90	1,088.54	United Kingdom
739.77	659.15	308.01	1,281.65	United Republic of Tanzania
3,445.87	10,750.13	10,205.77	6,761.73	United States of America

Country details table: estimates for 2013

COUNTRY/ TERRITORY	IDF REGION	Number of people with diabetes (20-79) in 1000s, Male	Number of people with diabetes (20-79) in 1000s, Female	Number of people with diabetes (20-79) in 1000s, Rural setting	Number of people with diabetes (20-79) in 1000s, Urban setting
Uruguay	SACA	66.46	77.36	18.33	125.49
US Virgin Islands	NAC	5.62	6.37	0.51	11.48
Uzbekistan	EUR	661.32	219.19	518.70	361.81
Vanuatu	WP	13.16	14.79	19.97	7.99
Venezuela (Bolivarian Republic of)	SACA	604.40	627.64	74.56	1,157.47
Viet Nam	WP	1,851.93	1,447.18	1,527.52	1,771.60
Western Sahara	AFR	17.63	14.19	2.37	29.44
Yemen	MENA	346.95	361.17	433.83	274.29
Zambia	AFR	101.86	92.06	119.20	74.72
Zimbabwe	AFR	273.64	327.03	282.88	317.79
WORLD		197,694.96	184,139.39	136,085.32	245,749.03

Number of people with diabetes (20-39) in 1000s	Number of people with diabetes (40-59) in 1000s	Number of people with diabetes (60-79) in 1000s	Number of people with undiagnosed diabetes (20-79) in 1000s	COUNTRY/TERRITORY
18.52	66.32	58.97	34.59	Uruguay
1.06	5.02	5.91	3.32	US Virgin Islands
44.51	530.59	305.41	258.34	Uzbekistan
7.78	13.99	6.19	15.12	Vanuatu
220.55	605.86	405.63	296.30	Venezuela (Bolivarian Republic of)
748.22	1,565.39	985.50	2,079.76	Viet Nam
12.59	15.81	3.41	23.89	Western Sahara
171.32	343.60	193.19	354.06	Yemen
90.21	73.46	30.24	145.60	Zambia
365.51	140.30	94.86	451.01	Zimbabwe
62,991.98	184,228.08	134,614.30	174,822.59	WORLD

Abbreviations and acronyms

A

AFR

Africa

C

CVD

cardiovascular disease

D

DALY

Disability-Adjusted Life Years

DIAMOND

Diabetes Mondiale study

DIP

Diabetes in pregnancy

DM

diabetes mellitus

E

EUR

Europe

EURODIAB

Europe and Diabetes study

G

GDM

gestational diabetes mellitus

GDP

gross domestic product

H

HbA1c

glycosylated haemoglobin A1c

HIP

Hyperglycaemia in pregnancy

HIV/AIDS

human immuno-deficiency virus/acquired immune deficiency syndrome

I

ID

International dollar

IDF

International Diabetes Federation

IFG

impaired fasting glucose

IGT

impaired glucose tolerance

L

LMICs

low- and middle-income countries

M

MA

Member Association

MDGs

Millennium Development Goals

MENA

Middle East and North Africa

N

N/A

not available

NAC

North America and Caribbean

NCDs

Non-communicable diseases

NGO

non-governmental organisation

S

SACA

South and Central America

SEA

South-East Asia

U

UK

United Kingdom

UN

United Nations

USA

United States of America

USD

United States Dollar

W

WHO

World Health Organization

WP

Western Pacific

Glossary

B

beta cells

Beta cells are found in the islets of Langerhans in the pancreas. They produce and release insulin.

C

cardiovascular disease (CVD)

Cardiovascular diseases are defined as diseases and injuries of the circulatory system: the heart, the blood vessels of the heart and the system of blood vessels throughout the body and to (and in) the brain. Stroke is the result of a blood flow problem within, or leading to, the brain and is considered a form of CVD.

comparative prevalence
see prevalence

D

diabetes complications

Diabetes complications are acute and chronic conditions caused by diabetes. Chronic complications include retinopathy (eye disease), nephropathy (kidney disease), neuropathy (nerve disease), cardiovascular disease (disease of the circulatory system), foot ulceration and amputation.

diabetes mellitus (DM)

Diabetes mellitus is a chronic condition that arises when the pancreas does not produce enough insulin or when the body cannot effectively use the insulin produced. There are two basic forms of diabetes: type 1 and type 2. People with type 1 diabetes do not produce enough insulin. People with type 2 diabetes produce insulin but cannot use it effectively.

diabetic foot

A foot that exhibits any pathology that results directly from diabetes or complication of diabetes.

E

epidemiology

The study of the occurrence and distribution of health-related states or events in specified populations, including the study of the determinants influencing such states, and the application of this knowledge to the control of health problems.

G

gestational diabetes mellitus (GDM)

Diabetes first diagnosed during pregnancy in women.

glucose

Also called dextrose. The main sugar the body produces from proteins, fats and carbohydrates. Glucose is the major source of energy for living cells and is carried to each cell through the bloodstream. However, the cells cannot use glucose without the help of insulin.

glycosylated haemoglobin (HbA1c)

Haemoglobin to which glucose is bound. Glycosylated haemoglobin is tested to monitor the long-term control of diabetes mellitus. The level of glycosylated haemoglobin is increased in the red blood cells of persons with poorly controlled diabetes mellitus.

H

hyperglycaemia

A raised level of glucose in the blood; a sign that diabetes is out of control. It occurs when the body does not have enough insulin or cannot use the insulin it does have to turn glucose into energy. Signs of hyperglycaemia are great thirst, dry mouth and need to urinate often.

hypoglycaemia

Too low a level of glucose in the blood. This occurs when a person with diabetes has injected too much insulin, eaten too little food, or has exercised without extra food. A person with hypoglycaemia may feel nervous, shaky, weak, or sweaty, and have a headache, blurred vision and hunger.

I **impaired fasting glucose (IFG)**

impaired fasting glucose (IFG) is a category of higher than normal blood, but below the diagnostic threshold for diabetes after fasting (typically after an overnight fast). For a full definition see the diagnostic criteria (www.who.int/diabetes). People with IFG are at increased risk of developing diabetes.

impaired glucose tolerance (IGT)

Impaired glucose tolerance (IGT) is a category of higher than normal blood, but below the diagnostic threshold for diabetes, after ingesting a standard amount of glucose in an oral glucose tolerance test. For a full definition see the diagnostic criteria (www.who.int/diabetes). People with IGT are at increased risk of developing diabetes.

incidence

It indicates how often a disease occurs. More precisely, it corresponds to the number of new cases of a disease among a certain group of people for a certain period of time.

insulin

A hormone whose main action is to enable body cells to absorb glucose from the blood and use it for energy. Insulin is produced by the beta cells of the islets of Langerhans in the pancreas.

International Dollar

It is a hypothetical unit of currency that has the same purchasing power in every country. Conversions from local currencies to international dollars are calculated using tables of purchasing power parities (PPP), which are taken

from studies of prices for the same basket of goods and services in different countries.

islets of Langerhans

Named after Paul Langerhans, the German scientist who discovered them in 1869, these clusters of cells are located in the pancreas. They produce and secrete hormones that help the body break down and use food. There are five types of cells in an islet including beta cells which produce insulin.

N **national prevalence**

see prevalence

nephropathy

Caused by damage to small blood vessels which can cause the kidneys to be less efficient, or to fail altogether.

neuropathy

Occurs when blood glucose and blood pressure are too high, diabetes can harm nerves throughout the body and cause damage to the nerves.

P **pancreas**

The pancreas is an organ situated behind the lower part of the stomach which produces insulin.

prevalence

The proportion of individuals in a population which at a particular time (be it a point in time or time period) has a disease or condition. Prevalence is a proportion or number and not a rate.

> comparative prevalence

The comparative prevalence in this publication has been calculated by assuming that every country and region has the same age profile (the age profile of the world population has been used). This reduces the effect of the differences of age between countries and regions, and makes this figure appropriate for making comparisons. The comparative prevalence figure should not be used for assessing the proportion of people within a country or region who have diabetes.

> national or regional prevalence

The national or regional prevalence indicates the percentage of each country's or region's population that has diabetes. It is appropriate for assessing the burden of diabetes for each country or region.

R **R (from health expenditures estimates)**

R is the Diabetes Cost Ratio, which is the ratio of all medical care costs for persons with diabetes to all medical care costs for age- and sex-matched persons who do not have diabetes. By comparing the total costs of matched persons with and without diabetes, the costs that diabetes causes can be isolated. As R varies from country to country and over time, the IDF estimates show results for likely lower and upper bounds of R, R=2 and R=3.

retinopathy

Retinopathy is a disease of the retina of the eye which may cause visual impairment and blindness.

S**stroke**

A sudden loss of function in part of the brain as a result of the interruption of its blood supply by a blocked or burst artery.

T**type 1 diabetes**

Type 1 diabetes mellitus develops most frequently in children and adolescents. About 10% of people with diabetes have type 1. The symptoms of type 1 vary in intensity. Symptoms include excessive thirst, excessive passing of urine, weight loss and lack of energy. Insulin is a life-sustaining medication for people with type 1 diabetes. They require daily insulin injections for survival.

type 2 diabetes

Type 2 diabetes mellitus is much more common than type 1, and occurs mainly in adults although it is now also increasingly found in children and adolescents. The symptoms of type 1, in a less marked form, may also affect people with type 2. Some people with type 2, however, have no early symptoms and are only diagnosed several years after the onset of the condition, when various diabetic complications are already present. People with type 2 may require oral hypoglycaemic drugs and may also need insulin injections.

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Chapter 1

What is diabetes?

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Chapter 2

The global burden

2.1 Diabetes

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