IDF **DIABETES** ATLAS

Fifth edition

International Diabetes Federation

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Draft resolution submitted by the President of the General Assembly

Political declaration of the High-level Meeting of the General Assembly on the Prevention and Control of Non-communicable Diseases

The General Assembly,

Adopts the Political Declaration of the High-level Meeting of the General Assembly on the Prevention and Control of Non-communicable Diseases annexed to the present resolution.

Annex

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

We, Heads of State and Government and representatives of States and Governments, assembled at the United Nations from 19 to 20 September 2011, to address the prevention and control of non-communicable diseases worldwide, with a particular focus on developmental and other challenges and social and economic impacts, particularly for developing countries,

1. Acknowledge that the global burden and threat of non-communicable diseases constitutes one of the major challenges for development in the twenty-first century, which undermines social and economic development throughout the world, and threatens the achievement of internationally agreed development goals;

2. Recognize that non-communicable diseases are a threat to the economies of many Member States, and may lead to increasing inequalities between countries and populations;

3. Recognize the primary role and responsibility of Governments in responding to the challenge of non-communicable diseases and the essential need for the efforts

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Foreword

The International Diabetes Federation is proud to release the 5th edition of the *IDF Diabetes Atlas*, once again showing that diabetes is a global epidemic. The Atlas is the authoritative source of evidence on the burden of diabetes for health professionals, scientists, economists, policy-makers, and national and international agencies.

The evidence presented in previous editions of the *IDF Diabetes Atlas* has been used widely by news media, governments, and international organisations such as the World Bank, the World Health Organization, the Organisation for Economic Co-operation and Development, and the World Economic Forum. Estimates from the 4th edition were instrumental in providing the evidence to drive the unanimous adoption of the resolution for the September 2011 UN High-level Meeting on Non-Communicable Diseases. This summit will ensure that non-communicable diseases such as diabetes will no longer simply be a footnote on the global health agenda.

In this edition of the *IDF Diabetes Atlas*, the estimated number of adults living with diabetes has soared to 366 million, representing 8.3% of the global adult population. This number is projected to increase to 552 million people by 2030, or 9.9% of adults, which equates to approximately three more people with diabetes every 10 seconds. These estimates are considerably higher than those reported in the 4th edition, largely due to new data available from China, the Middle East, and Africa.

The estimates confirm that diabetes continues to disproportionately affect the socially disadvantaged, and is increasing especially rapidly in low- and middle-income countries. The main drivers of the epidemic are economic development and urbanisation, which bring changes in lifestyle, and increasing life expectancy. The health systems in many of these countries are not currently equipped to meet the rising demand of diabetes and non-communicable diseases.

Despite these seemingly overwhelming statistics, we have solutions to meet the challenges of diabetes. IDF brought together a panel of experts to develop a global plan for diabetes using evidence-based strategies. Countries will be able to use this plan to develop their health systems and policies to curb the epidemic and improve the lives of those affected by diabetes. Countries have demonstrated their political will to raise the priority of non-communicable diseases through the UN High-level Meeting. We now expect governments, international agencies, and industry to move from rhetoric to action by following through on this commitment and work together to provide the resources to make this plan a reality.

Information is a powerful tool. On behalf of IDF, I would like to express my profound gratitude to the people who contributed their time and their expertise to this edition, and to the sponsors for their generous support.

We need to work together to ensure the commitments made at the UN High-level Meeting in 2011 are turned into actions, not just for the millions who have diabetes today, but for the millions yet to come. People with diabetes and their families deserve a better future.

Professor Jean Claude Mbanya
President,
International Diabetes Federation

Introduction

Since the publication of the fourth edition of the Diabetes Atlas in 2009, the global awareness of diabetes and other major non-communicable diseases (NCDs) and their impact on socio-economic development has increased considerably. Today, we are witnessing an escalating demand for scaling up coordinated global action to address the unrelenting rise of diabetes, cardiovascular disease, cancer and chronic respiratory disease and their shared risk factors, namely tobacco use, unhealthy diet, physical inactivity and the harmful use of alcohol.

The *Global Strategy for the Prevention and Control of Non-communicable Diseases*, which was endorsed by the World Health Assembly in 2000, identifies three major components for any global or national initiative: monitoring NCDs and their causes, preventing NCDs by reducing risk factors, and improving health care to those affected. The recently published *Global Status Report on Non-communicable Diseases 2010* is the first detailed description of the global burden of NCDs, their risk factors and determinants. The report also brings together the collective experience in reducing the burden and provides policy makers with solutions and clear positions on surveillance, prevention and health care, based on current knowledge on cost-effective interventions.

The apparent prevalence of hyperglycaemia depends on the diagnostic criteria used in epidemiological surveys. The *Global Status Report on Non-communicable Diseases* estimates the global prevalence of diabetes in the year 2008 to be around 10% in people aged 25 years and older. The prevalence was highest in the Eastern Mediterranean Region and the Americas. However, the magnitude of diabetes and other abnormalities of glucose tolerance is considerably higher than these estimates if categories of "impaired fasting glycaemia" and "impaired glucose tolerance" are also included. The regional diabetes prevalence correlates with the prevalence of known diabetes risk factors - overweight, which is particularly common in women, as is physical inactivity, which rises with income. In 2008, 35% of adults were overweight and the prevalence of obesity almost doubled from 1980 to 2008. Almost 50% of women in the Americas and Eastern Mediterranean were physically inactive in 2008.

We now have sound vision and a clear road map in addressing diabetes through a focus on surveillance, population-based prevention, and improving health care. And we know that early detection and integration of essential standards for managing diabetes into primary health care is a cost-effective measure and a "best buy" for all countries. The challenge is for countries to scale up their capacity to respond, strengthen their health systems and integrate basic diabetes care into their package of essential health care interventions.

This fifth edition of the *IDF Diabetes Atlas* provides valuable information on the current diabetes burden and its consequences. It provides policy makers, researchers, health care providers and the general public with estimates on several aspects of diabetes by region and country. The number of people aged 20 to 79 years with diabetes in the world in 2011 is estimated to be 366 million. This is somewhat higher than the 346 million in people aged 25 years and over, estimated for 2008 in the *Global Status Report on Non-communicable Diseases*. Despite some differences in the methodology, and different age and calendar years of the estimates, both documents reveal a similar and worrying picture of the enormous global magnitude of the diabetes burden.

Both the *Global Status Report on Non-communicable Diseases* and the *IDF Diabetes Atlas* reveal that many countries do not have accurate data on diabetes and risk factors. Such countries will need to build effective surveillance mechanisms to monitor diabetes and other NCDs as an integral part of their national health information systems. This would be essential for policy development and evaluation and it would also improve the accuracy of future estimates.

The *2008–2013 Action Plan for the Global Strategy for the Prevention and Control of Non-communicable Diseases* emphasizes the importance of promoting partnerships for the prevention and control of NCDs. The last two years, since the publication of Diabetes Atlas 2009, have witnessed strengthened joint work and coordination between WHO and IDF in the areas of diabetes as well as other major NCDs. Further collaboration between WHO and IDF on harmonizing the methodology for generating diabetes estimates is a desirable further step in improving their accuracy and reliability. Joint efforts to build country capacity for surveillance and for implementing prevention and health care interventions will also help in providing a solid basis for an effective global campaign to reduce the diabetes burden and its adverse health and socio-economic consequences.

Dr Ala Alwan
Assistant Director General
World Health Organization

Executive summary

This edition of the *IDF Diabetes Atlas* comes at a significant moment in the history of diabetes prevention and care. On 13 May 2010 the United Nations unanimously adopted Resolution 64/265 to hold a High-level Meeting on Non-Communicable Diseases (NCDs).

The High-level Meeting, held on 19 and 20 September 2011, provided the platform for governments to show that they are ready to face the challenges of diabetes in all countries, rich and poor, by committing to policies to provide essential care for people living with diabetes and to prevent new cases of diabetes.

The *IDF Diabetes Atlas*, 5th edition, constitutes an important part of the evidence base governments, civil society, international health organisations, and the health community need to make informed decisions about prevention and care strategies. This edition contains new information not available in previous editions and also aims to stimulate action where gaps in knowledge about diabetes exist. Pressing issues that require immediate attention from governments are also highlighted in this edition.

This edition of the *IDF Diabetes Atlas* aims to convey five key messages:

1. Diabetes is a huge and growing problem, and the costs to society are high and escalating;
2. Diabetes is a neglected development issue, affecting all countries;
3. There are cost-effective solutions to reverse the global diabetes epidemic;
4. Diabetes is not only a health issue, its causes are multi-sectoral and it requires a multi-sectoral response;
5. The UN High-level Meeting is not the end of international commitments on diabetes; it is the start of concerted and co-ordinated action.

Chapter 1 defines diabetes and briefly describes the different types of diabetes and related major complications.

The continuing escalation of diabetes prevalence worldwide and the burden it imposes on the individual, society, and economy is captured in Chapter 2. This chapter looks at the extent of the diabetes epidemic and its bearing on morbidity and mortality as well as the healthcare expenditures caused by the disease.

The global figures on the prevalence of diabetes and impaired glucose tolerance (IGT) in Chapter 2 are based on estimates for 216 countries and territories for 2011 and 2030. The estimates of diabetes-related mortality show that the number of deaths is considerable and of a similar or greater magnitude to that caused by several infectious diseases that receive considerably more attention from policy-makers, researchers, donors, and the public. At the same time, the projections for healthcare expenditures due to diabetes show that there is a wide variation in spending between countries, and that more resources should be invested in cost-effective interventions, particularly in the low- and middle-income countries.

Chapter 3 provides an overview of the diabetes situation in each of the seven IDF Regions. The summaries show the differences in the burden of diabetes and the expected changes over the next 20 years.

Chapter 4 shows how diabetes and development are inextricably linked, affecting low-, middle- and high-income countries. The chapter covers the relationship between diabetes and tuberculosis, the social determinants of diabetes, comparisons of the burden of diabetes in countries in different income groups, and why diabetes threatens the achievement of the Millennium Development Goals (MDGs).

Chapter 5 summarises some of the ways in which IDF links the diabetes community from the local to the global level. It summarises the process leading up to the UN High-level Meeting and analyses how the Political Declaration will affect the future of diabetes. Chapter 5 also highlights activities ranging from bringing the global diabetes community together through the World Diabetes Congress, raising global diabetes awareness with the World Diabetes Day campaign, to promoting best practice in diabetes education.

Chapter 6 highlights the global solutions for meeting the challenge of diabetes. It also provides useful resources and web links, and includes a list of the International Diabetes Federation's position statements on topical issues and clinical guidelines.

A summary table of country estimates of the key data is provided in Appendices. Background papers on which the summaries have been based are available on the website, www.idf.org/diabetesatlas/papers. Tables with more detailed estimates of the prevalence of diabetes and IGT, mortality, and healthcare expenditures are also available on the website.

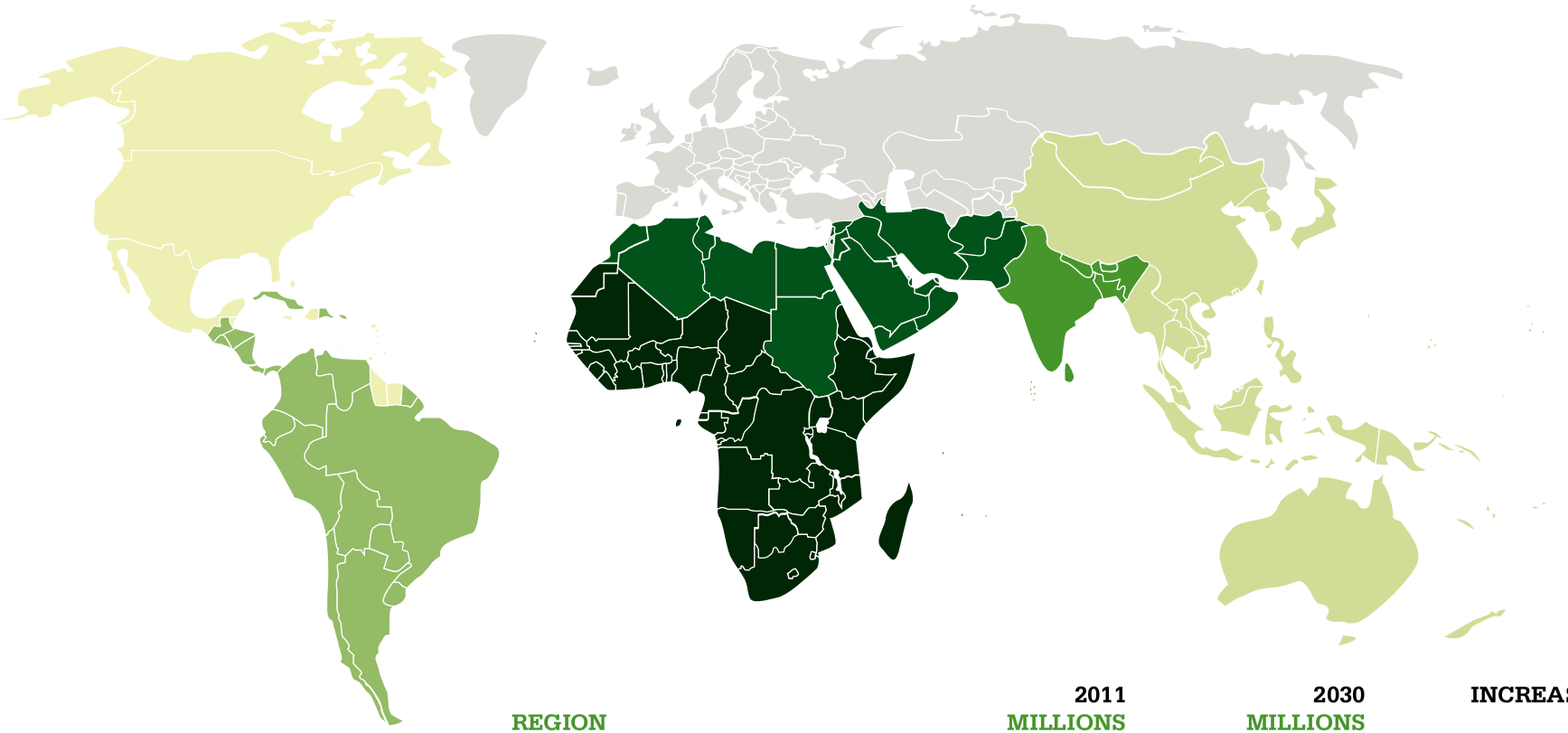
Two sets of prevalence (%) figures, national and comparative, for diabetes and IGT are provided. The national, or crude, prevalence indicates the percentage of each country's population that has diabetes, and is appropriate for assessing the burden of diabetes for each country. The comparative prevalence (%) has been calculated by assuming that every country has the same age profile (the age profile of the world population), which makes this figure appropriate for making comparisons between countries.

Top 10: Countries/territories of number of people with diabetes (20-79 years), 2011 and 2030

	COUNTRY /TERRITORY	2011 MILLIONS
1	China	**90.0**
2	India	**61.3**
3	United States of America	**23.7**
4	Russian Federation	**12.6**
5	Brazil	**12.4**
6	Japan	**10.7**
7	Mexico	**10.3**
8	Bangladesh	**8.4**
9	Egypt	**7.3**
10	Indonesia	**7.3**

	COUNTRY /TERRITORY	2030 MILLIONS
1	China	**129.7**
2	India	**101.2**
3	United States of America	**29.6**
4	Brazil	**19.6**
5	Bangladesh	**16.8**
6	Mexico	**16.4**
7	Russian Federation	**14.1**
8	Egypt	**12.4**
9	Indonesia	**11.8**
10	Pakistan	**11.4**

Map: IDF Regions and global projections of the number of people with diabetes (20-79 years), 2011 and 2030



REGION	2011 MILLIONS	2030 MILLIONS	INCREASE %
Africa	14.7	28.0	90%
Middle East and North Africa	32.8	59.7	83%
South-East Asia	71.4	120.9	69%
South and Central America	25.1	39.9	59%
Western Pacific	131.9	187.9	42%
North America and Caribbean	37.7	51.2	36%
Europe	52.6	64.0	22%
World	**366.2**	**551.8**	**51%**

What is diabetes?

> There are **3 main types** of diabetes: type 1, type 2 and gestational diabetes mellitus

> People with type 1 diabetes will **die without insulin**

> People with type 2 diabetes can remain **undiagnosed** for many years

> Poorly managed diabetes leads to **serious complications** and early death

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

1 What is diabetes?

Diabetes is a chronic condition that occurs when the body cannot produce enough or effectively use insulin.[1] Insulin is a hormone produced by 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. As a result, a person with diabetes does not absorb glucose properly, and glucose stays circulating in the blood (hyperglycaemia) damaging tissues over time. This damage leads to life-threatening health complications.

There are three main types of diabetes:

- type 1 diabetes
- type 2 diabetes
- gestational diabetes mellitus (GDM)

Type 1 diabetes

Type 1 diabetes is caused by an auto-immune reaction, where the body's defence system attacks the insulin-producing cells in the pancreas. As a result, the body can no longer produce the insulin it needs. The reason why this occurs is not fully understood. The disease can affect people of any age, but it usually occurs in children or young adults. People with this form of diabetes need injections of insulin every day in order to control the levels of glucose in their blood. Without insulin, people with type 1 diabetes will die.

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

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

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

The number of people developing type 1 diabetes is increasing each year. 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 it is either not sufficient or the body is not responding to its effects, leading to a build-up of glucose in the blood.

People with type 2 diabetes may 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. Many people are diagnosed only when complications of diabetes become evident (see *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
- increasing age
- family history of diabetes
- ethnicity
- poor nutrition during pregnancy affecting the developing child

In contrast to people with type 1 diabetes, the majority of those with type 2 diabetes do not usually require daily doses of insulin to survive. However, they may be prescribed insulin together with oral medication, a healthy diet and increased physical activity to manage their condition.

The number of people with type 2 diabetes is rising 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 mellitus

Women who are first diagnosed with diabetes during pregnancy are said to have gestational diabetes mellitus (GDM). In women who develop diabetes during pregnancy, it normally occurs later in pregnancy and arises because the body is unable to make and use enough insulin needed for pregnancy.

As gestational diabetes normally develops later in pregnancy, the baby is already well-formed but still growing. The risk to the baby is therefore lower than to those whose mothers have type 1 or type 2 diabetes before pregnancy. However, women with GDM still have to control blood glucose levels to minimise risks to the baby. This can normally be done through a healthy diet but insulin or oral medication may also be needed.

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

Impaired glucose tolerance and impaired fasting glucose

People with high blood glucose levels, but not as high as those in people with diabetes, are said to have impaired glucose tolerance (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 fast.

People with IGT have a higher 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. However, not everyone with IGT goes on to develop type 2 diabetes.

Diabetes complications

People with diabetes have an increased risk of developing a number of serious health problems. Consistently high blood glucose levels can lead to serious diseases affecting the heart and blood vessels, eyes, kidneys, and nerves. In addition, people with diabetes also have a higher 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. 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 kinds of cardiovascular disease 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 increase the risk of cardiovascular complications.

Kidney disease

Kidney disease (nephropathy) is much more common in people with diabetes than those without 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

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

Nerve damage

When blood glucose and blood pressure are too high, diabetes can cause damage to nerves throughout the body (neuropathy). Problems with digestion and urination, impotence, and many other functions can result, but the most commonly affected areas are the extremities, and in particular 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 important because it can allow injuries to go unnoticed, leading to serious infections, diabetic foot, and amputations.

Diabetic foot

People with diabetes may develop a number of different foot problems as a result of nerve and blood vessel damage. These problems can easily lead to infection and ulcers which increase a person's risk of amputation. People with diabetes carry a risk of amputation that may be more than 25 times greater than that of people without diabetes.[3] However, with comprehensive management, a large proportion of amputations related to diabetes can be prevented. Even when amputation takes place, the remaining leg and the person's life can be saved by good follow-up care from a multidisciplinary foot team.[4] People with diabetes must regularly examine their feet.

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 type 1 diabetes require more planning and monitoring before and during pregnancy to minimise complications. High blood glucose during pregnancy can lead to changes in the foetus which cause it to put on excess weight (macrosomia) and overproduce insulin. These can lead to problems in delivery, trauma to the child and mother, and a sudden drop in blood sugar (hypoglycaemia) for 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 diabetes in the future.

Other

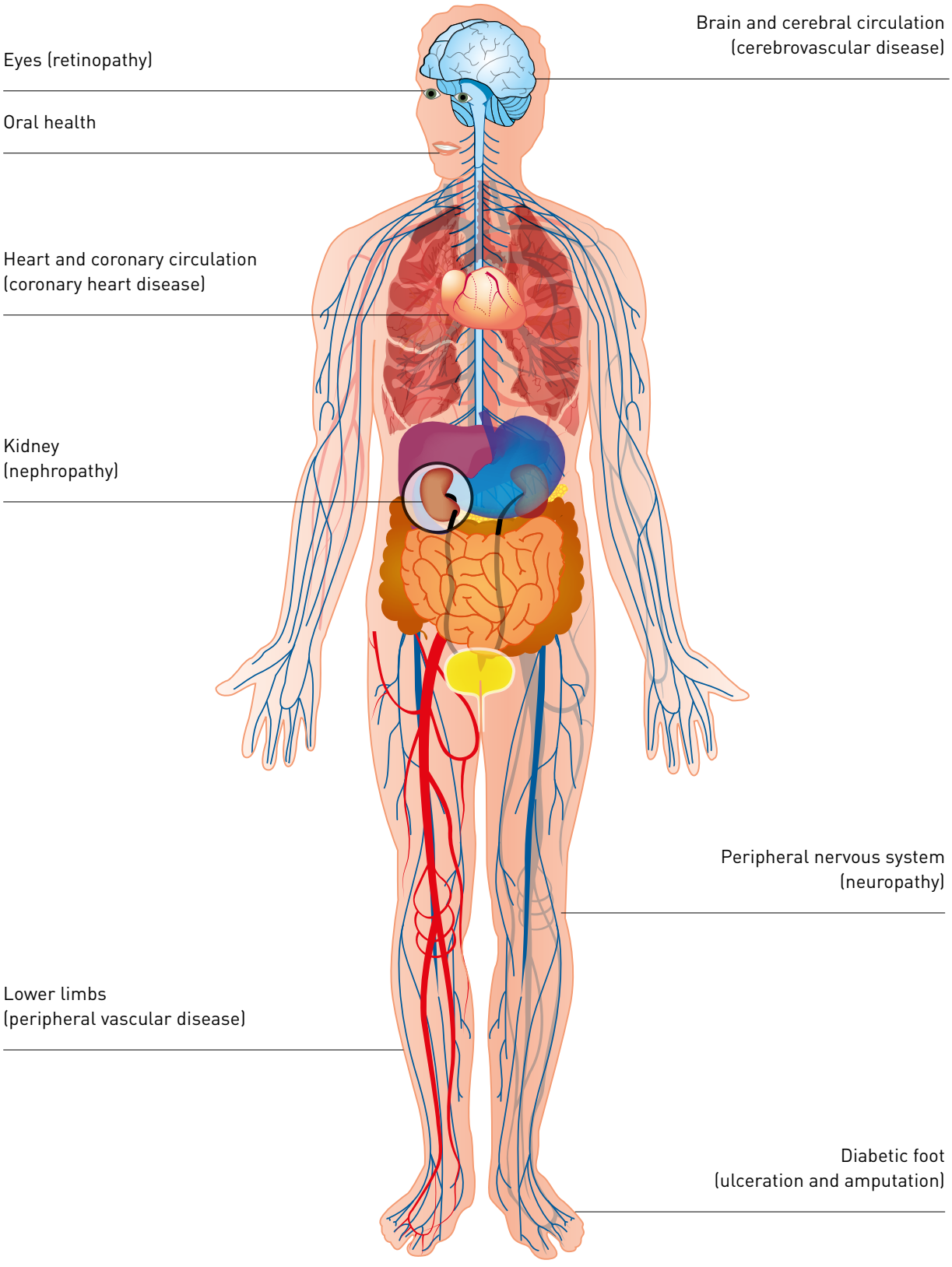
Oral health

Although not typically considered a complication, diabetes can pose a threat to oral health, for example with an increased risk of gingivitis (inflammation of the gums) in those 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 (OSA), the most common form of sleep disordered breathing. Estimates suggest that up to 40% of people with OSA will have diabetes, but the incidence of new diabetes in people with OSA is not known.[5] OSA may have effects on controlling blood glucose in people with type 2 diabetes.

Figure 1.1. The major diabetes complications



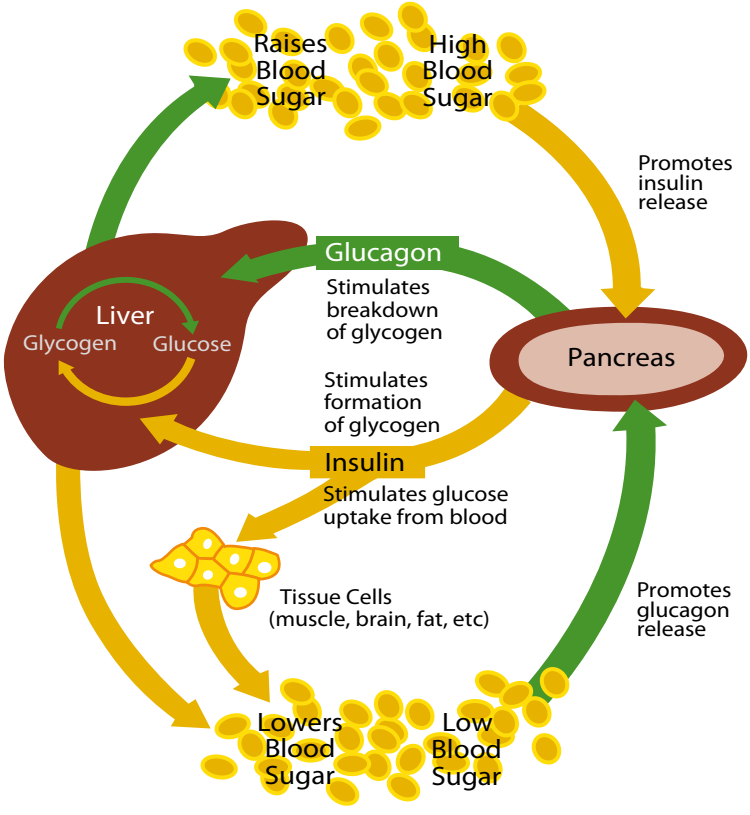
Box 1.1. Insulin

Insulin is the hormone produced by the pancreas that allows glucose to enter the body's cells where it is converted into energy that is needed for our daily lives.

People with type 1 diabetes cannot survive without insulin, and need daily injections. People with type 2 or gestational diabetes may also need injections of insulin together with other medication.

Frederick Banting and Charles Best discovered insulin in 1921 and gave life and hope to people with type 1 diabetes. Huge advances have been made in research and development in creating genetically engineered human insulin. Until recently, insulin was made from the pancreas of cattle and pigs. However, in many parts of the world, people with type 1 diabetes still do not have access to insulin and therefore die soon after developing the disease.

Figure 1.2. Insulin production and action



Insulin is a hormone produced by the pancreas that is necessary for cells to be able to use blood glucose.

In response to high levels of glucose in the blood, the insulin-producing cells in the pancreas secrete the hormone insulin. Type 1 diabetes occurs when these cells are destroyed by the body's own immune system.

The global burden

2

- **366 million** people have diabetes in 2011; by 2030 this will have risen to **552 million**
- The number of people with type 2 **diabetes is increasing** in every country
- **80%** of people with diabetes live in **low- and middle-income countries**
- The **greatest number** of people with diabetes are between **40 to 59 years of age**
- **183 million** people (50%) with diabetes are **undiagnosed**
- Diabetes caused **4.6 million deaths** in 2011
- Diabetes caused at least **USD 465 billion dollars** in healthcare expenditures in 2011; **11% of total healthcare expenditures** in adults (20-79 years)
- **78,000 children** develop **type 1 diabetes** every year

2 The global burden

Diabetes and impaired glucose tolerance (IGT)

Diabetes mellitus is one of the most common non-communicable diseases (NCDs) globally. 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 in 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 (LMICs) that face the greatest burden of diabetes. However, many governments and public health planners still remain largely unaware of the current magnitude, or, more importantly, the future potential for increases in diabetes and its serious complications in their own countries.

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 symptoms may not be recognised as being related to diabetes.

In addition to diabetes, the condition of impaired glucose tolerance (IGT), in which the blood glucose level is higher than normal but not as high as in diabetes, is also a major public health problem. People with IGT have a higher 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 mellitus and IGT are estimated for the years 2011 and 2030. Data are provided for 216 countries and territories (see Appendices), 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 methods paper published in the journal *Diabetes Research and Clinical Practice* and on the *IDF Diabetes Atlas* website: www.idf.org/diabetesatlas/papers.

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 for different people.

There are no internationally agreed standards for diagnosing and assessing diabetes complications. Due to different methods of assessing the presence of these complications it is difficult to make comparisons between different populations.

However, it is clear that they are very common, with at least one complication present in a large proportion of people (50% or more in some studies) at the time of diagnosis.

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

AT A GLANCE	2011	2030
Total world population (billions)	**7.0**	**8.3**
Adult population (20-79 years. billions)	**4.4**	**5.6**

DIABETES AND IGT (20-79 YEARS)		
Diabetes		
Global prevalence (%)	**8.3**	**9.9**
Comparative prevalence (%)	**8.5**	**8.9**
Number of people with diabetes (millions)	**366**	**552**
IGT		
Global prevalence (%)	**6.4**	**7.1**
Comparative prevalence (%)	**6.5**	**6.7**
Number of people with IGT (millions)	**280**	**398**

Table 2.1. Top 10 countries/territories for prevalence* (%) of diabetes (20-79 years), 2011 and 2030

	COUNTRY /TERRITORY	2011 PREVALENCE (%)
1	Kiribati	**25.7**
2	Marshall Islands	**22.2**
3	Kuwait	**21.1**
4	Nauru	**20.7**
5	Lebanon	**20.2**
6	Qatar	**20.2**
7	Saudi Arabia	**20.0**
8	Bahrain	**19.9**
9	Tuvalu	**19.5**
10	United Arab Emirates	**19.2**

	COUNTRY /TERRITORY	2030 PREVALENCE (%)
1	Kiribati	**26.3**
2	Marshall Islands	**23.0**
3	Kuwait	**21.2**
4	Tuvalu	**20.8**
5	Nauru	**20.7**
6	Saudi Arabia	**20.6**
7	Lebanon	**20.4**
8	Qatar	**20.4**
9	Bahrain	**20.2**
10	United Arab Emirates	**19.8**

*comparative prevalence

2.1. Diabetes

Diabetes can be found in every country in the world and without effective prevention and management programmes the burden will continue to increase globally.[1]

Type 2 diabetes makes up about 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 now a common and serious global health problem, which, for most countries, has developed together with rapid cultural and social changes, ageing populations, increasing urbanisation, dietary changes, reduced physical activity, and other 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 people with diabetes in the younger age groups have type 1.

Gestational diabetes mellitus (GDM) is common and, like obesity and type 2 diabetes, is increasing throughout the world. The risk of developing diabetes is very high in women who have had GDM. The reported prevalence of GDM varies widely among different populations around the world. Much of the variability is due to differences in diagnostic criteria and study populations. As a result it has not been possible in this report to estimate the prevalence of GDM as there are few population-based studies on this form of diabetes. Nonetheless, the challenges of GDM have to be addressed and further research is required in this area.

Prevalence

Some 366 million people worldwide, or 8.3% of adults, are estimated to have diabetes in 2011. About 80% live in low- and middle-income countries. If these trends continue, by 2030, some 552 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 dominated by developing economies. This estimate is much larger than in the previous edition, and is mostly due to the inclusion of new data sources from China, the Middle East, and Africa.

Age distribution

In 2011, the greatest number of people with diabetes is in the 40 to 59 age group. More than three-quarters of the 179 million people with diabetes in this age group live in low- and middle-income countries.

This age group will continue to have the greatest number of people with diabetes in the coming years; by 2030, it is expected that this number will increase to 250 million. Again, more than 86% will be living in low- and middle-income countries.

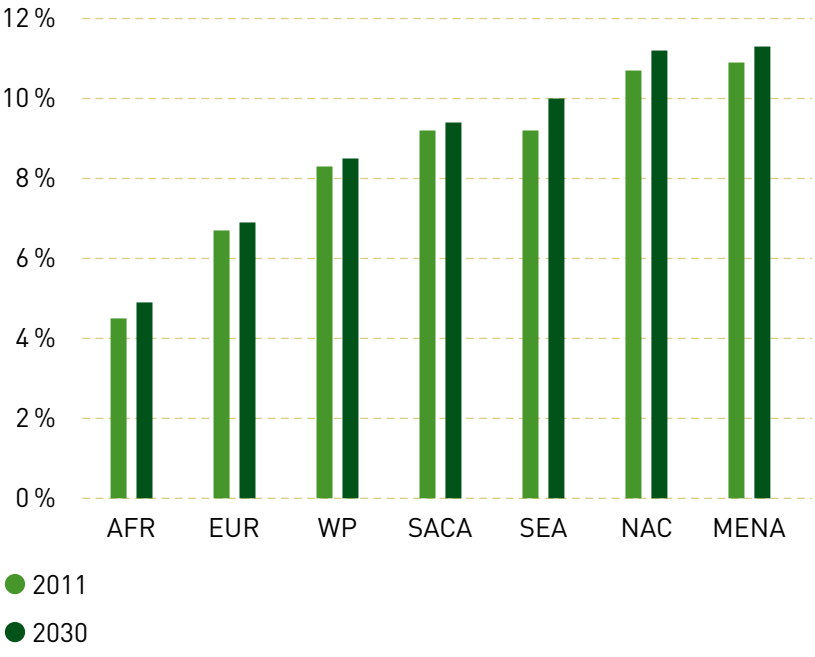
Gender distribution

There is little gender difference in the global number of people with diabetes for both 2011 and 2030. There are about four million more men than women with diabetes (185 million men vs 181 million women) in 2011. However, this difference is expected to decrease to two million (277 million men vs 275 million women) by 2030.

Urban/rural distribution

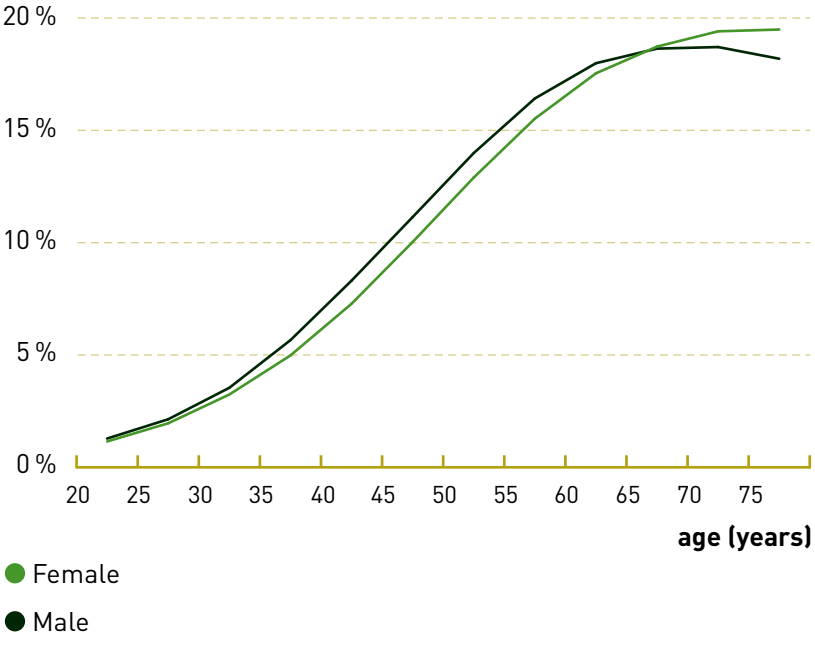
There continues to be more people with diabetes living in urban than in rural areas. In low- and middle-income countries, the number of people with diabetes in urban areas is 172 million while 119 million live in rural areas. By 2030 the difference is expected to widen with 314 million people living in urban areas and 143 million in rural areas.

Figure 2.1. Prevalence*(%) of diabetes (20-79 years) by IDF region, 2011 and 2030

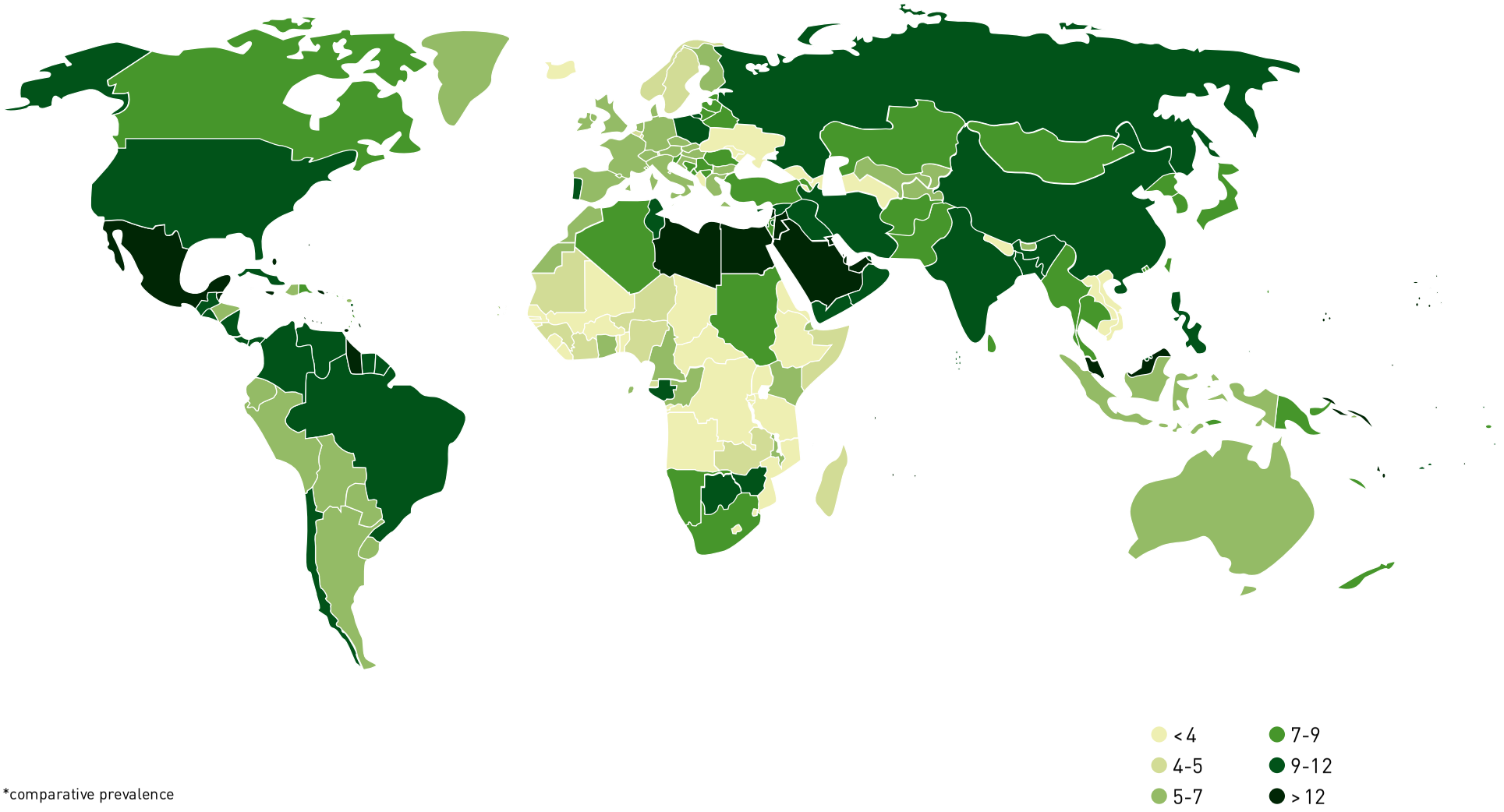


*comparative prevalence

Figure 2.2. Prevalence (%) of people with diabetes by age and sex, 2011

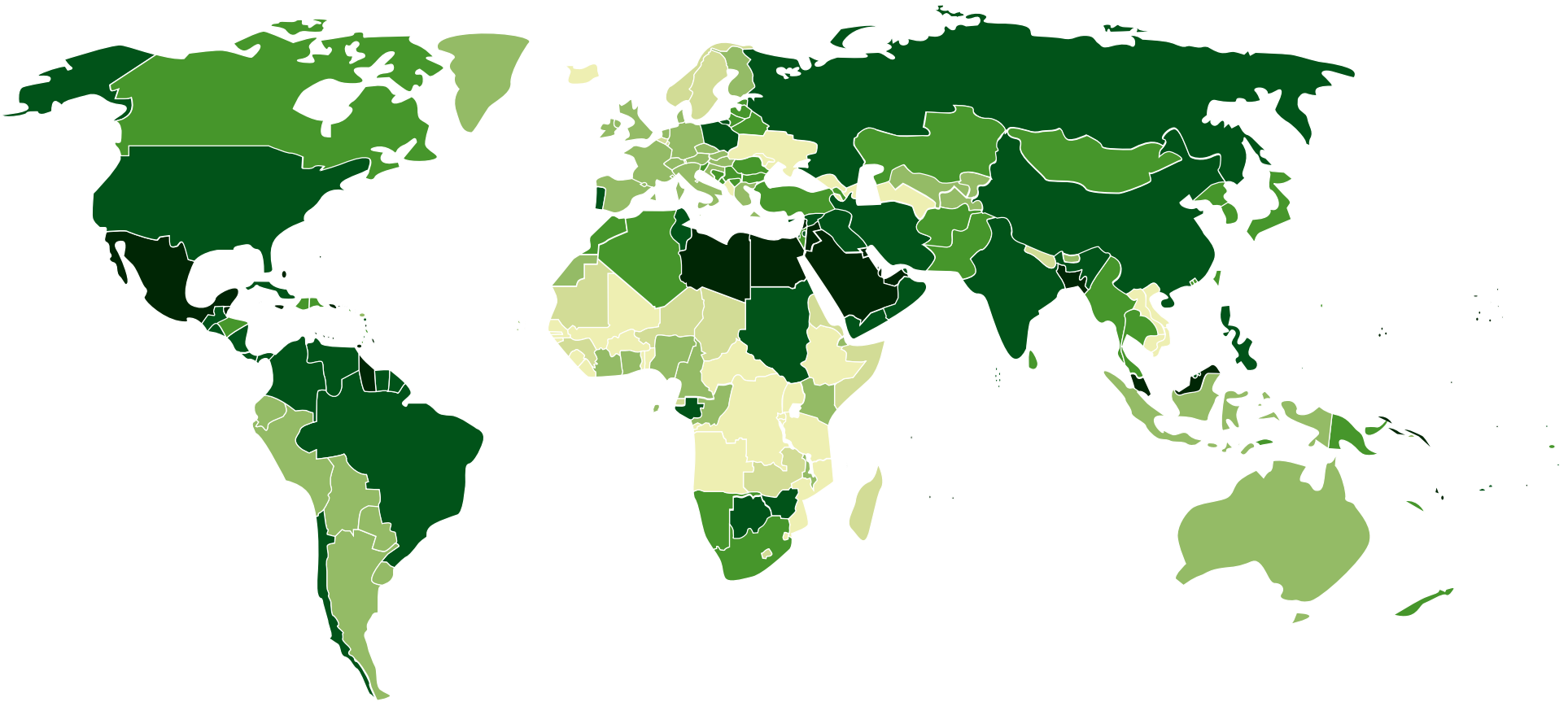


Map 2.1. Prevalence*(%) of diabetes in (20-79 years), 2011



*comparative prevalence

Map 2.2. Prevalence*(%) of diabetes (20-79 years), 2030



*comparative prevalence

2.2. Impaired glucose tolerance (IGT)

Impaired glucose tolerance (IGT), along with impaired fasting glucose (IFG), is recognised as being a stage before diabetes when blood glucose levels are higher than normal. Thus, people with IGT are at high risk of developing type 2 diabetes, although this does not always happen. In more than one-third of people with IGT blood glucose levels will return to normal over a period of several years.

Data on IGT is included in this report because IGT greatly increases the risk of developing type 2 diabetes,[1] 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 of people with IGT.

Prevalence

Some 280 million people worldwide, or 6.4% of adults, are estimated to have IGT in 2011. The vast majority (70%) of these people live in low- and middle-income countries. By 2030, the number of people with IGT is projected to increase to 398 million, or 7.1% of the adult population.

Age distribution

As with diabetes, the majority of people with IGT are aged 40 to 59, with 123 million being affected. This age group will continue to have the highest number of people with IGT in 2030 with 168 million people affected, as shown in Figure 2.3. It is also important to note that nearly one-third of all those who currently have IGT are in the 20 to 39 age group, and are therefore likely to spend many years at increased risk of diabetes.

The prevalence of IGT is generally similar to that of diabetes, but somewhat higher in the Africa and Western Pacific Regions and slightly lower in the North America and Caribbean Region.

Figure 2.3. Number of people with impaired glucose tolerance by age group (20-79 years), 2011 and 2030

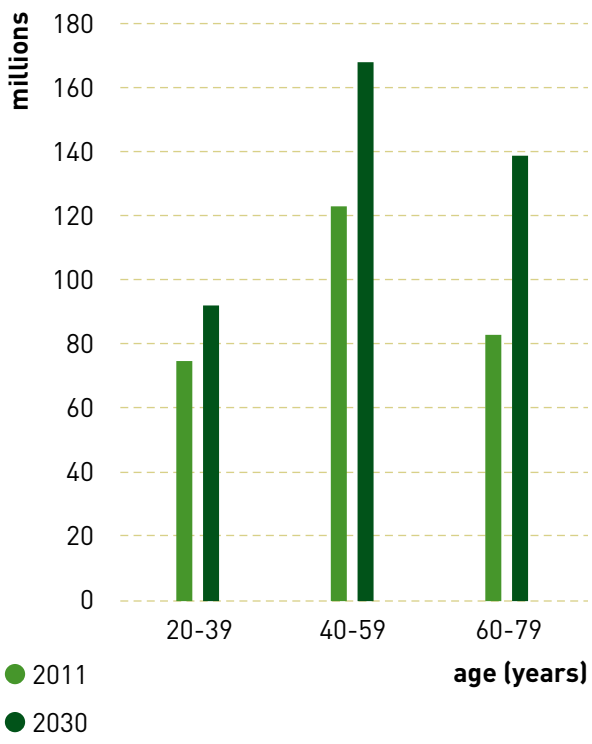
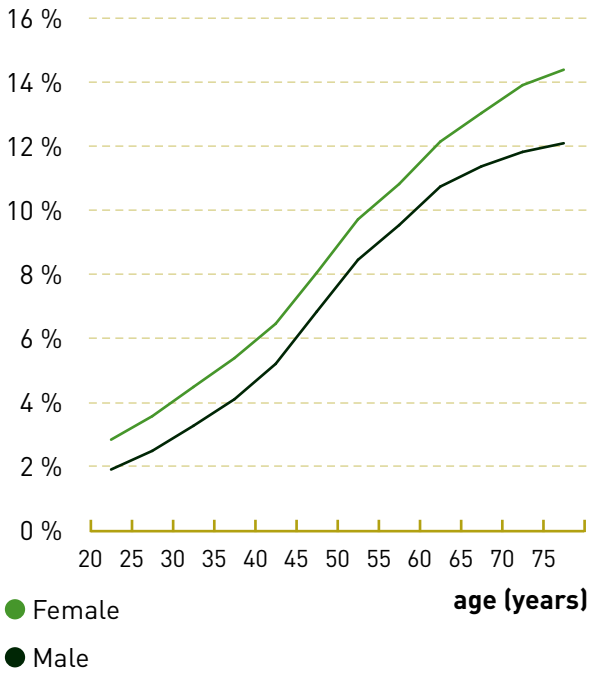
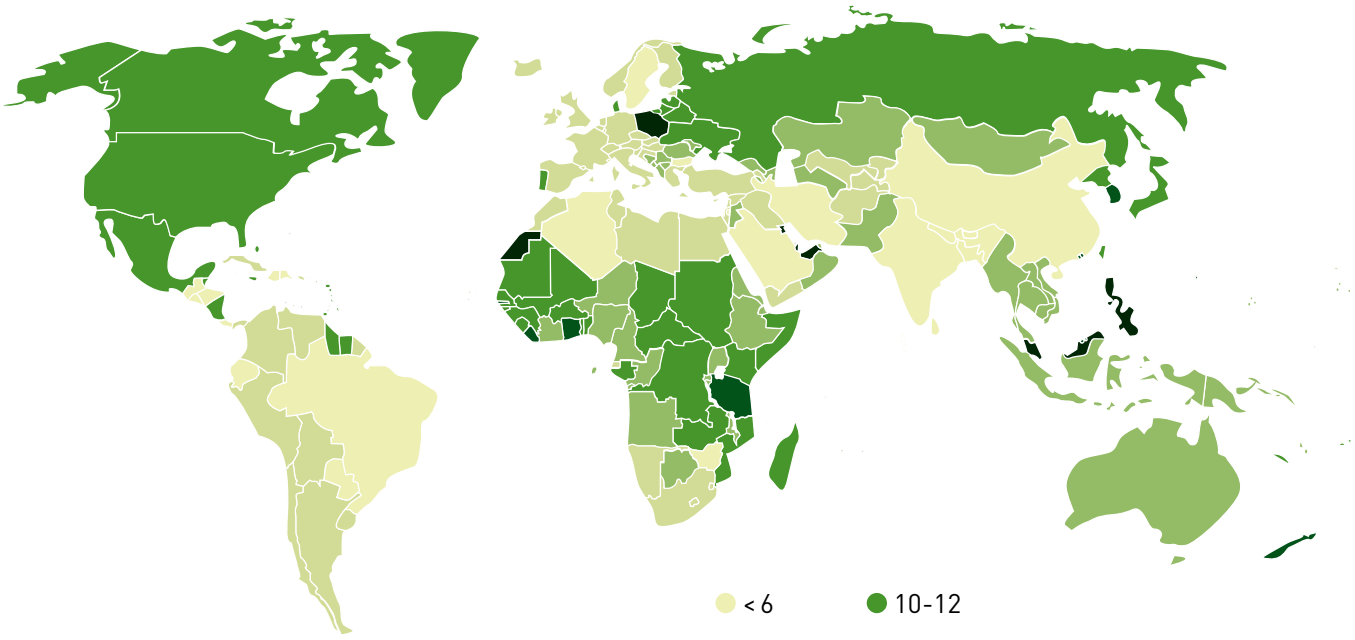


Figure 2.4. Prevalence (%) of people with impaired glucose tolerance (20-79 years) by age and sex, 2011



Map 2.3. Prevalence*(%) of impaired glucose tolerance (20-79 years), 2011



*comparative prevalence

Table 2.2. Top 10 countries/territories for prevalence* (%) of IGT (20-79 years), 2011 and 2030

	COUNTRY /TERRITORY	2011 PREVALENCE (%)
1	Malaysia	**18.4**
2	Kuwait	**18.1**
3	Qatar	**16.8**
4	Poland	**16.6**
5	Bahrain	**16.5**
6	United Arab Emirates	**16.4**
7	Western Sahara	**15.6**
8	Philippines	**14.6**
9	China. Hong Kong SAR	**13.5**
10	Gambia	**13.4**

	COUNTRY /TERRITORY	2030 PREVALENCE (%)
1	Malaysia	**19.0**
2	Kuwait	**18.3**
3	United Arab Emirates	**17.2**
4	Bahrain	**17.0**
5	Qatar	**17.0**
6	Poland	**16.3**
7	Western Sahara	**16.1**
8	Philippines	**15.0**
9	Gambia	**14.8**
10	Ghana	**14.0**

*comparative prevalence

2.3. Undiagnosed diabetes

IDF estimates that globally as many as 183 million people, or half of those who have diabetes, are unaware of their condition. Most of these have 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 urgent need for diagnosing and providing appropriate care to people with diabetes is therefore very high.

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 can reach up to 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 (36.2 million) and the Western Pacific Region (73.5 million) together account for over 60% of all people with undiagnosed diabetes. Globally, 85% of all people who remain undiagnosed are in low- and middle-income countries.

Complications

A person with diabetes can live for several years without showing any symptoms, during which 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 thought to be 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 lifestyles. Studies have found that many people with undiagnosed diabetes already have complications such as chronic kidney disease and heart failure, retinopathy and neuropathy.[2, 3, 4]

Costs

The costs associated with diabetes include increased use of health services, lost productivity, and disability which can be a considerable burden to the individual, to families and to society. When people have undiagnosed diabetes the opportunities and 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]

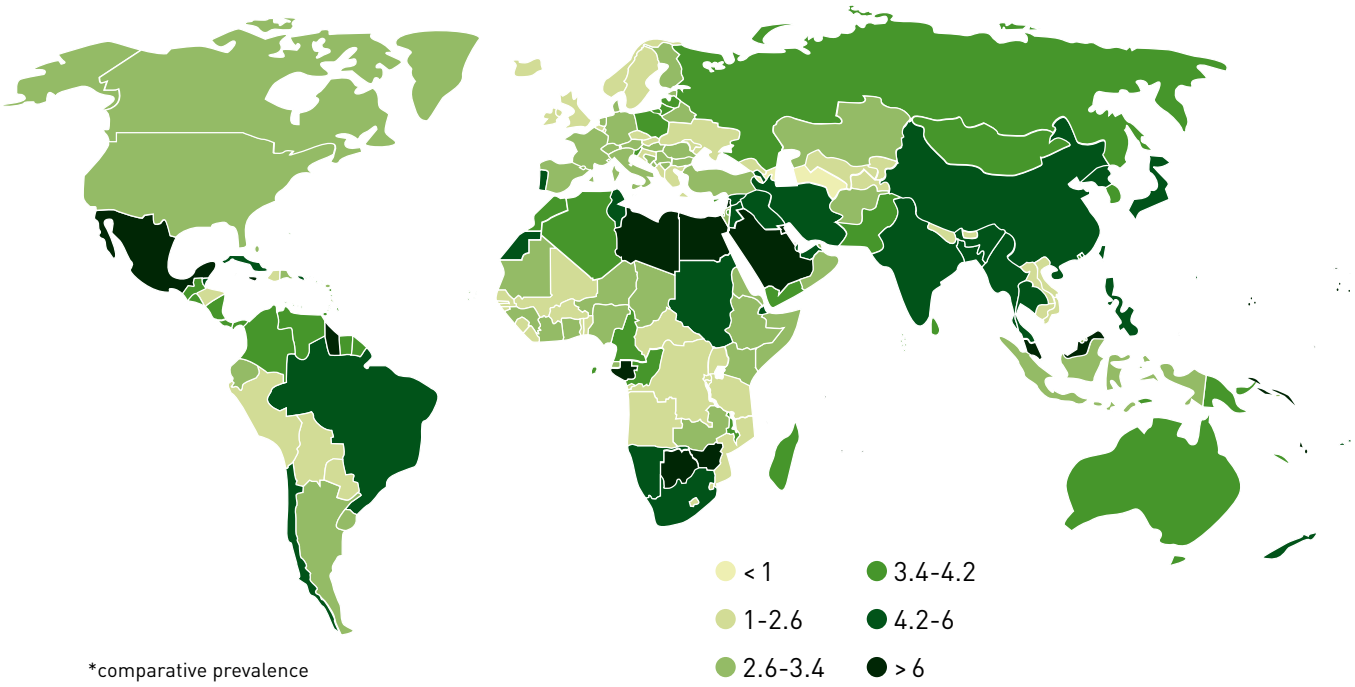
Identification of people with diabetes

Opportunistic identification of people with risk factors for undiagnosed type 2 diabetes is feasible and cost effective. Risk scores and 'tick tests' listing risk factors for undiagnosed diabetes 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 diabetes. Priority should be given to providing good care and treatment to those already identified with diabetes, and 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 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 for diabetes (Section 2.6).

Map 2.4. Prevalence*(%) of undiagnosed diabetes (20-79 years), 2011



*comparative prevalence

Table 2.3. Undiagnosed diabetes (20-79 years) by region and income group, 2011

REGION	PROPORTION UNDIAGNOSED (%)	CASES (MILLIONS)
Africa		**11.6**
Low-income countries	**77.9**	
Middle-income countries	**80.0**	
Europe		**19.0**
Low-income countries	**29.3**	
Middle-income countries	**35.9**	
High-income countries	**36.6**	
Middle East and North Africa		**19.2**
Low-income countries	**50.0**	
Middle-income countries	**61.6**	
High-income countries	**40.7**	
North America and Caribbean		**11.9**
Low-income countries	**29.4**	
Middle-income countries	**41.2**	
High-income countries	**27.7**	
South and Central America		**11.2**
Middle-income countries	**44.7**	
South-East Asia		**36.2**
Low-income countries	**48.1**	
Middle-income countries	**51.1**	
Western Pacific		**73.5**
Low-income countries	**63.0**	
Middle-income countries	**56.9**	
High-income countries	**46.7**	

2.4. Diabetes in the young

Type 1 diabetes is one of the most common endocrine and metabolic conditions in childhood and 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 now also being diagnosed in children.

Challenges of type 1 diabetes in children

Insulin treatment 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 and also to insulin is limited and this may lead to severe handicap and early death in children with diabetes.

Many children and adolescents may find it difficult to cope emotionally with their condition. Diabetes can result in discrimination and may limit social relationships. It may also have an impact on how well a child does in school. 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 of type 1 diabetes in children

Two international collaborative projects, the Diabetes Mondiale study (DiaMond)[1], the Europe and Diabetes study (EURODIAB)[2] and more recently in the USA the SEARCH for Diabetes in Youth study[3], have been instrumental in monitoring trends in incidence (the number of people developing diabetes in a year). This has been done through setting-up of 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, at least in those 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%. 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.

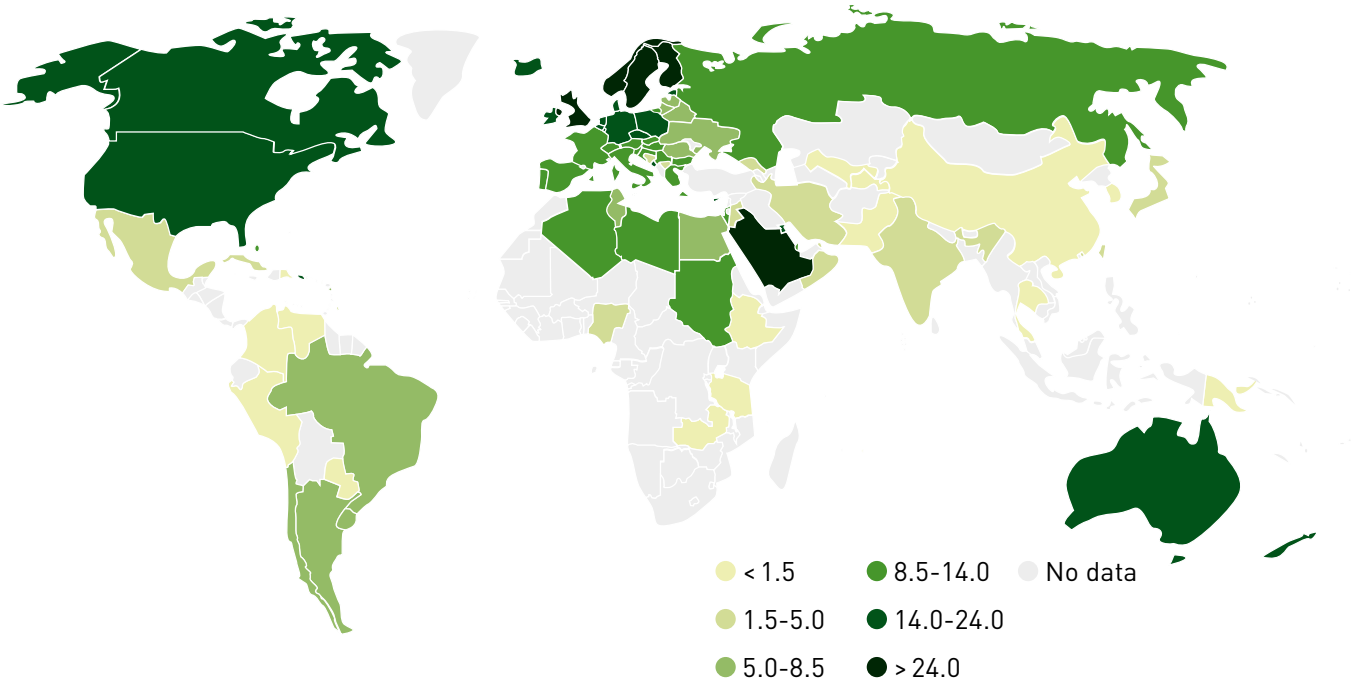
There is also evidence that similar trends exist in many other parts of the world, but in sub-Saharan Africa incidence data are sparse or non–existent. Special efforts must be made to collect data, especially in those countries where diagnosis may be missed.

Some 78,000 children under 15 years are estimated to develop type 1 diabetes annually worldwide. Of the estimated 490,000 children living with type 1 diabetes, 24% come from the European Region, where the most reliable and up-to-date estimates of incidence are available, and 23% from the South-East Asia Region.

Type 2 diabetes in the young

There is evidence that type 2 diabetes in children and adolescents is increasing in some countries, however reliable data are sparse. 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 in childhood 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.

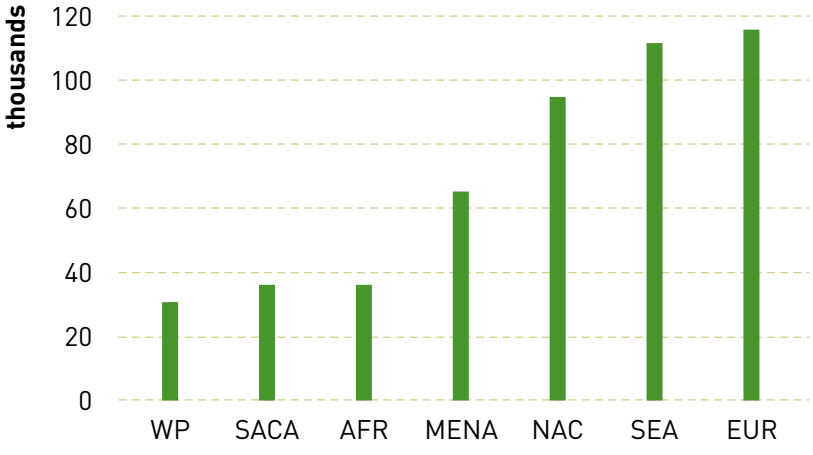
Map 2.5. New cases of type 1 diabetes (0-14 years per 100,000 children per year), 2011



AT A GLANCE	2011
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)	**490.1**
Number of newly-diagnosed children per year (thousands)	**77.8**
Annual increase in incidence (%)	**3.0**

Figure 2.5. Estimated number of children (0-14 years) with type 1 diabetes by IDF region, 2011



2.5. Mortality

Diabetes and its complications are major causes of early death in most countries. Cardiovascular disease (Chapter 1) is one of the leading causes of death for people with diabetes and 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 more than a third of countries do not have any data on diabetes-related mortality and also because existing routine health statistics underestimate the number of deaths due to diabetes. To provide a more realistic estimate of mortality, a modelling approach is used in the *IDF Diabetes Atlas* to estimate the number of deaths that can be attributed to diabetes in 2011.

Burden of mortality due to diabetes

Some 4.6 million people 20-79 years of age died from diabetes in 2011, accounting for 8.2% of global all-cause mortality of 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 seven seconds. Forty-eight percent of deaths due to diabetes are in people under the age of 60. The highest number of deaths due to diabetes is in countries with the largest numbers of people with diabetes – India, China, United States of America, and the Russian Federation (Appendices).

Gender distribution

There is no difference in the total number of deaths due to diabetes in men and women. However, there are important differences in the distribution of deaths for men and women.

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 in all but the Middle East and North Africa, and Western Pacific Regions. This higher proportion is due to a higher rate of mortality from other causes in men than in women.

Trends

The number of deaths attributable to diabetes in 2011 shows a 13.3% increase over the estimates for the year 2010.[1, 2] This increase is largely due to increases in the number of deaths due to diabetes in the South and Central America, Western Pacific, North America and Caribbean, and Middle East and North Africa Regions. This can be explained by a rise in diabetes prevalence in some highly populated countries in each region. While there has been a documented decline of the mortality due to some non-communicable diseases in some countries,[3] no such decline has been reported for diabetes.

Accuracy of mortality data

The mortality estimates in this report should be interpreted with caution. However, they are probably more realistic than estimates based on routine sources of health statistics which systematically underestimate the burden of mortality due to diabetes, largely because diabetes is often omitted from death certificates. A substantial proportion of these deaths are potentially preventable through public health action directed at primary prevention of diabetes in the population and improvement of care for all people with diabetes.[4]

* In 2009 there were 1.8 million deaths from HIV/AIDS,[5] 781,000 from malaria[6] and 1.3 million from tuberculosis.[7]

Map 2.6. Deaths attributable to diabetes (20-79 years), 2011

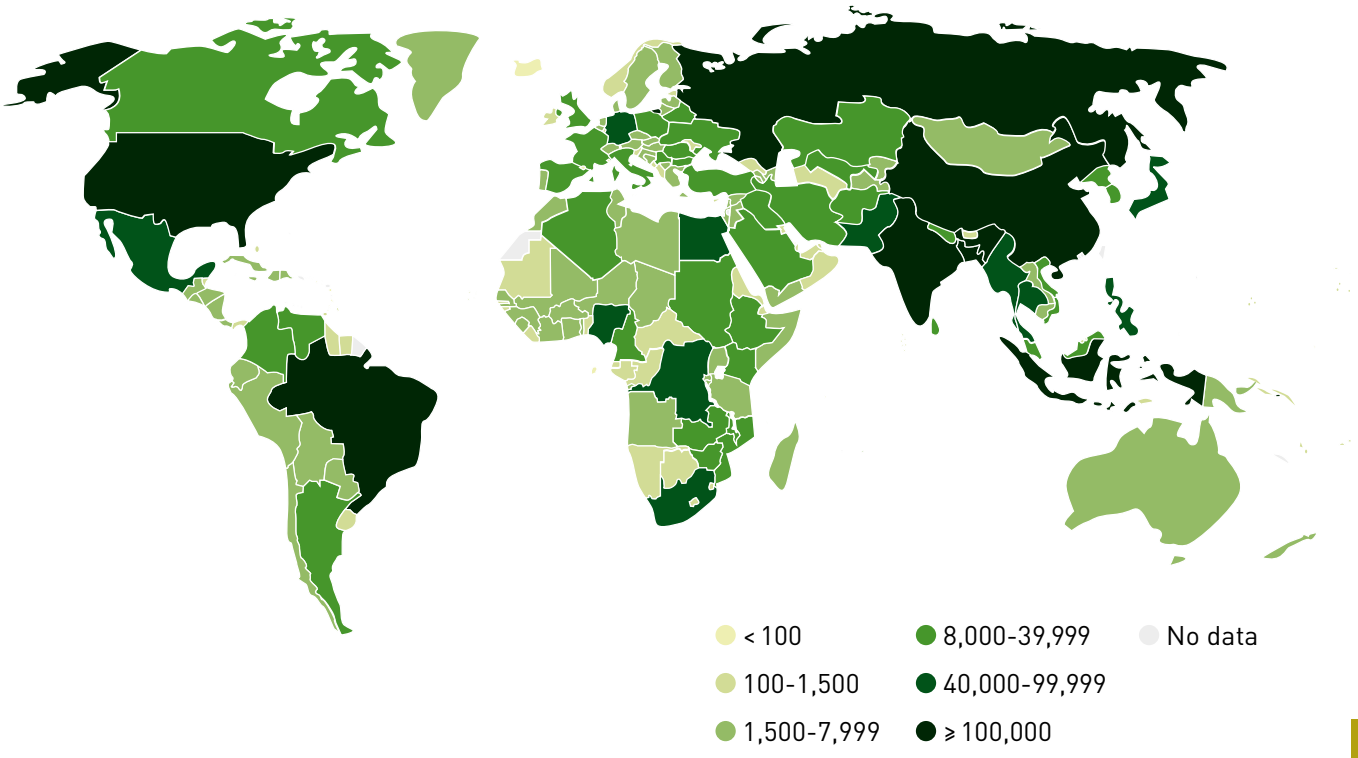
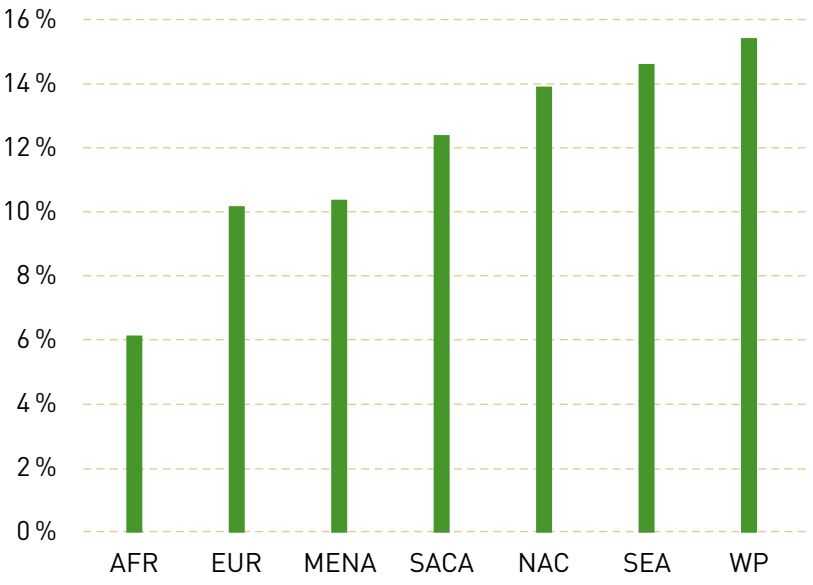


Figure 2.6. Deaths attributable to diabetes as a percentage of all deaths (20-79 years) by IDF region, 2011



2.6. Healthcare expenditures

Diabetes imposes a large economic burden on the individual, national healthcare systems, and countries. Healthcare expenditures due to diabetes account for 11% of the total healthcare expenditures in the world in 2011. About 80% of the countries covered in this report are estimated to spend between 5% and 18% of their total healthcare expenditures on diabetes. Healthcare expenditures include medical spending on diabetes by the health system as well as by people living with diabetes.

Global healthcare expenditures

Estimated global healthcare expenditures to treat diabetes and prevent complications totalled at least US dollars (USD) 465 billion in 2011. By 2030, this number is projected to exceed some USD 595 billion. Expressed in 2008 International Dollars (ID), which correct for differences in purchasing power, global healthcare expenditures on diabetes are estimated to be at least ID 499 billion in 2011 and ID 654 billion in 2030. An estimated average of USD 1,274 (ID 1,366) per person with diabetes was spent globally on treating and managing the disease in 2011.

Healthcare expenditures due to diabetes are not evenly distributed across age groups and genders. The estimates show that more than three-quarters of the global healthcare expenditure due to diabetes in 2011 are for people between the ages of 50 and 79 years.

Disparities in healthcare spending

There is a large disparity in healthcare spending on diabetes between regions and countries. Only 20% of global healthcare expenditures due to diabetes were made in low- and middle-income countries, where 80% of people with diabetes live. On average, the estimated healthcare spending due to diabetes was USD 5,063 (ID 4,888) per person with diabetes in high-income countries compared to USD 271 (ID 456) in low- and middle-income countries.

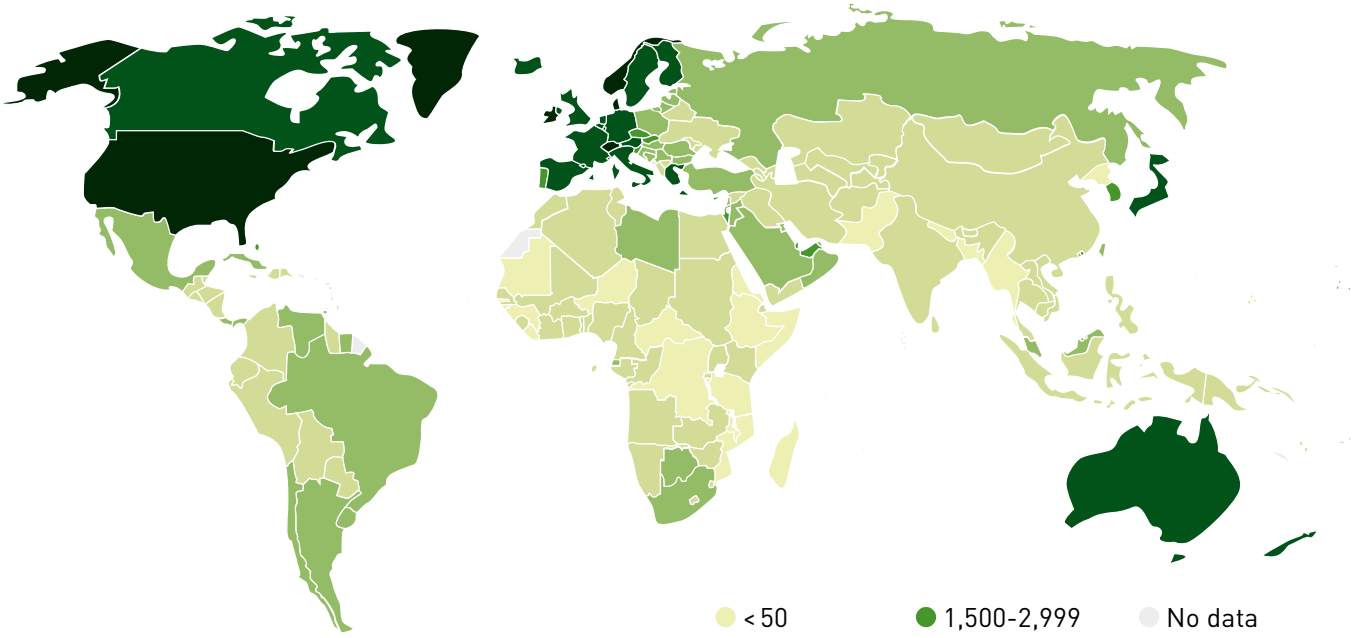
The United States of America spent USD 201 billion of its healthcare dollars on diabetes or 43% of global healthcare expenditure due to diabetes, while China, the country with the most people living with diabetes spent just USD 17 billion, or less than 4% of the global total. Similarly, Luxembourg spent an average of USD 9,341 on healthcare caused by diabetes per person with diabetes while countries such as Eritrea, Democratic People's Republic of Korea, and Myanmar spent less than USD 20 in 2011.

Economic burden

Those living in low- and middle-income countries pay a larger share of healthcare expenditures because they lack access to health insurance and publicly available medical services. In Latin America, for instance, families pay 40-60% of medical care expenditures 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.

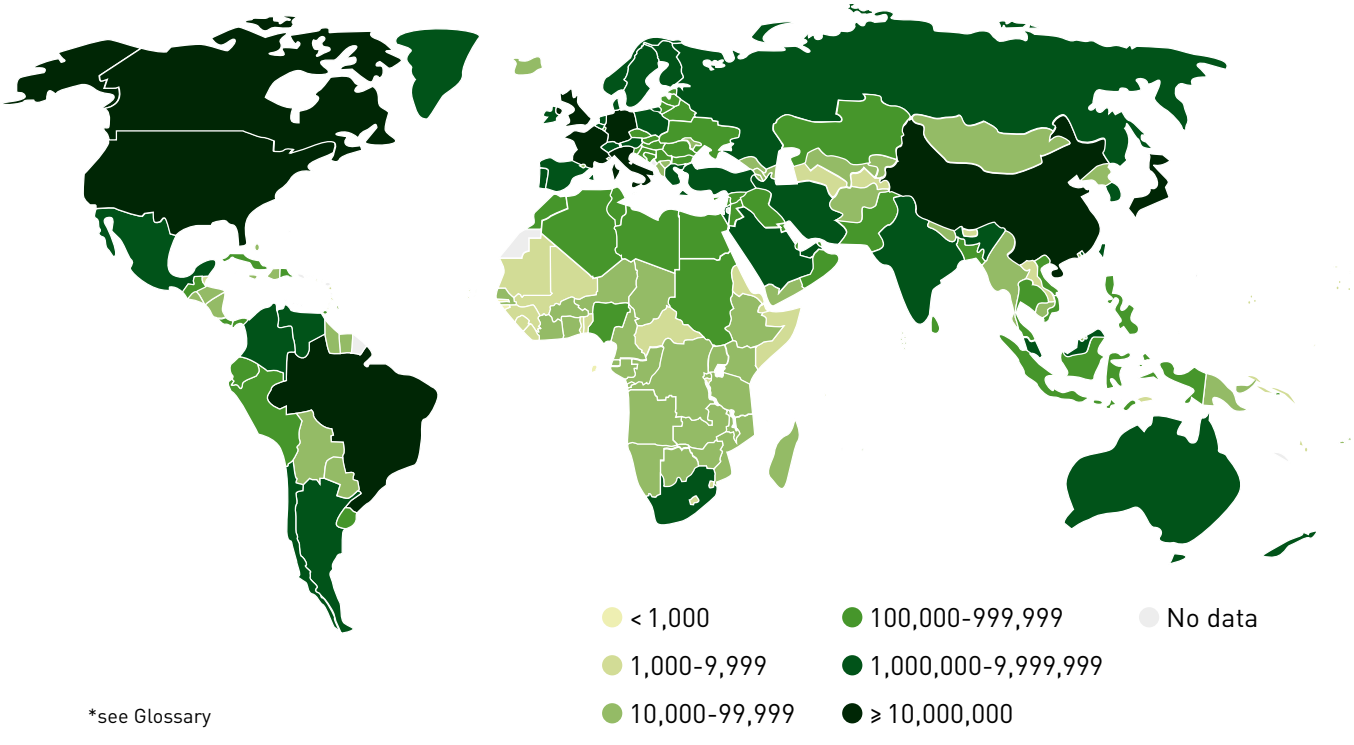
The huge economic burden of diabetes can be reduced by implementing inexpensive, easy-to-use interventions. Many of these interventions are cost-effective or cost-saving, even in the poorest countries. Nonetheless, these interventions are not widely used in low- and middle-income countries.

Map 2.7. Mean diabetes-related healthcare expenditures per person with diabetes (20-79 years) (USD), R=2*, 2011



*see Glossary

Map 2.8. Total healthcare expenditures due to diabetes (20-79 years) (USD), R=2*, 2011



*see Glossary

2.7. Generating the numbers

Generating global estimates of the burden of diabetes and impaired glucose tolerance (IGT) relies heavily on the availability of data from studies and surveys conducted in communities all over the world. These raw data provide a basis for modelling estimates at a national and global scale.

Sources review

The data used in this edition of the *IDF Diabetes Atlas* came from a variety of sources, including peer-reviewed literature, national and regional health surveys, personal communication provided from investigators in the IDF network and official reports by multinational organisations, such as the United Nations or the United States Centers for Disease Control and Prevention. A total of 565 data sources were reviewed for the estimates of diabetes in adults and IGT, of which 170 sources from 110 countries were included. An additional 88 sources were selected for the estimates of diabetes in the young.

From sources to estimates

After the selection process, the information gathered from the data sources is transformed to a standard format using statistical software and explicit criteria to fill in any gender and age gaps. The estimates for diabetes in adults take into account the proportion of people that live in urban areas and also correct for the number of expected undiagnosed cases. The estimates of prevalence (%) and incidence are then used to determine the number of people with diabetes using the latest population data available from the UN Population Division for each country and territory. The same method is used to generate estimates for 2011 and 2030. Projections take into account changes in population structure and urbanisation, but do not explicitly include changes in the prevalence of diabetes risk factors.

To generate comparative estimates, diabetes prevalence rates are adjusted throughout the Atlas to the current WHO standard population derived using estimates from the UN Population Division 1998, so that they are consistent with the most recent publications from the Global Burden of Disease project.

Comparative estimates are also given using the most recent population estimates from the United Nations Population Division 2010 Revision for 2011 (see Appendix). These population estimates are also used to model the national estimates, including the number of people with diabetes in 2011.

To estimate the mortality due to diabetes, two sets of data are used. The first are World Health Organization estimates of the total number of deaths in each country. The second are published regional estimates of the age- and sex-specific relative risk a person with diabetes has of dying compared to those without diabetes. That risk is then applied to all-cause mortality estimates taking into account the prevalence estimates for diabetes.

Finally, mortality and prevalence data are used to estimate the healthcare expenditures due to diabetes. Total healthcare expenditures for each country are taken from publicly available data. These numbers are then used together with information on the ratio of expenditures for people with diabetes compared to those without, adjusting for the number of people with diabetes in a country and adjusting for increased mortality-related costs.

Data quantity and quality

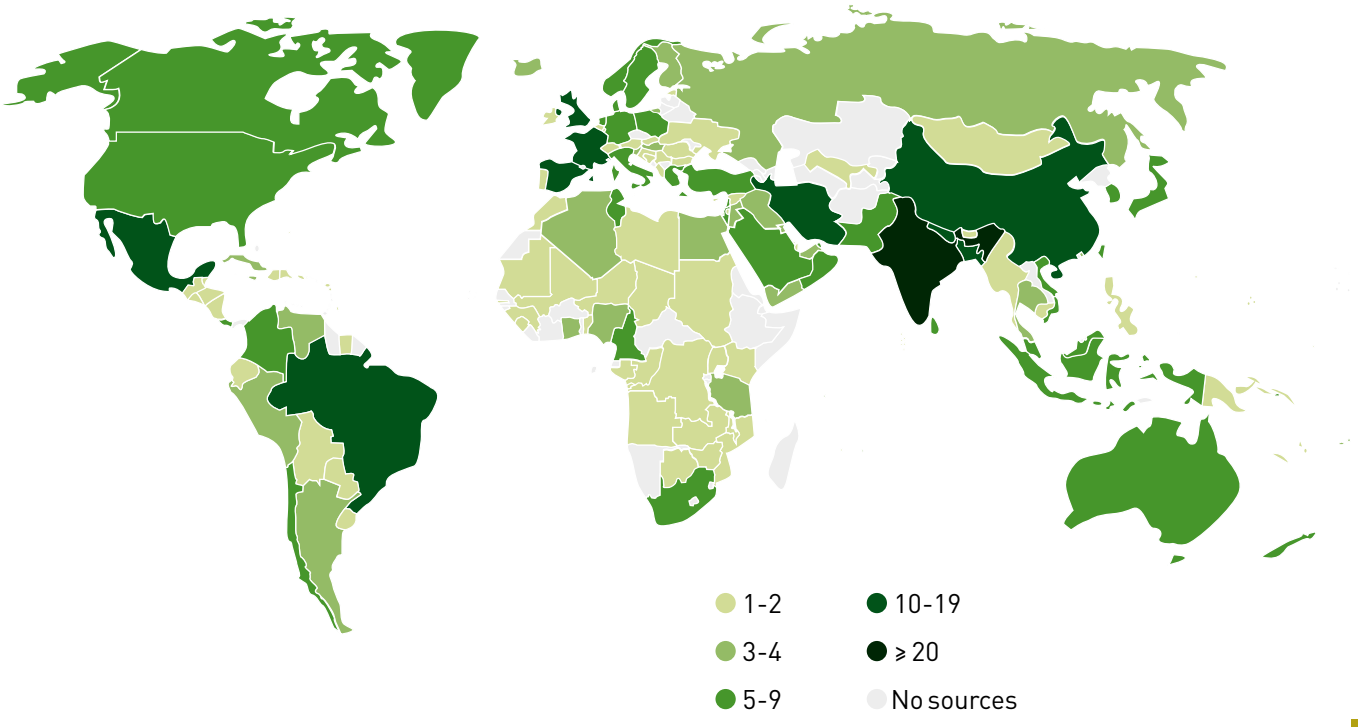
A number of countries do not have information on diabetes available. When there are no data available for a given country, information is taken from other countries matched on ethnicity, income level, and geography.

The lack of reliable data is a particular problem for low- and middle-income countries, but even some high-income countries do not have recent data. In addition, reliable mortality estimates and reporting on health expenditures are also vulnerable to the availability of good data.

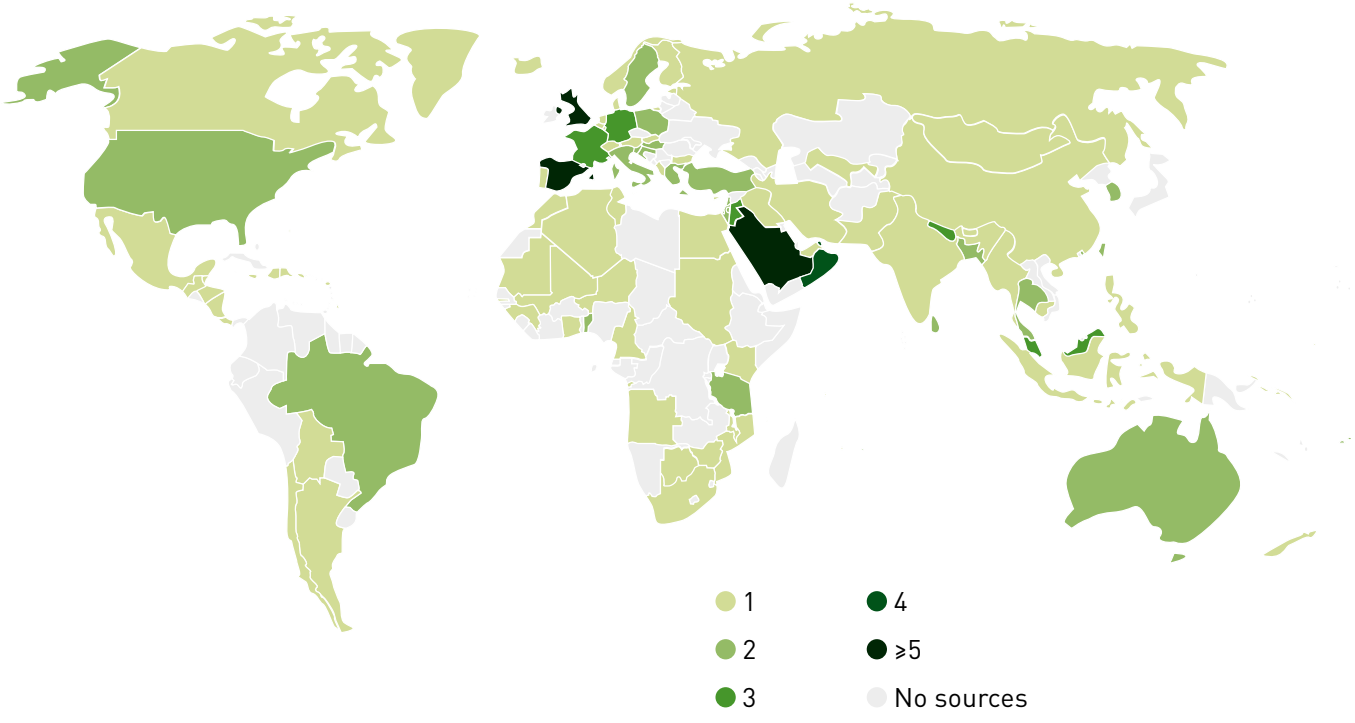
Barriers to finding usable data are not only tied to source quality, but to the way in which data are presented in the data sources. For example, data may be presented separately by age group and by gender, but ideally the data would be presented by age group for each gender.

All the estimates presented in the *IDF Diabetes Atlas* are sensitive to the quality of the data behind them. Efforts were made to contact investigators and validate numbers whenever needed. However, data and surveillance for diseases like diabetes must be representative, and regularly improved to ensure the estimates derived are reliable and sound. All the methods and data sources are described in detail in accompanying papers published in the journal Diabetes Research and Clinical Practice and are available on the IDF website www.idf.org/diabetesatlas/papers.

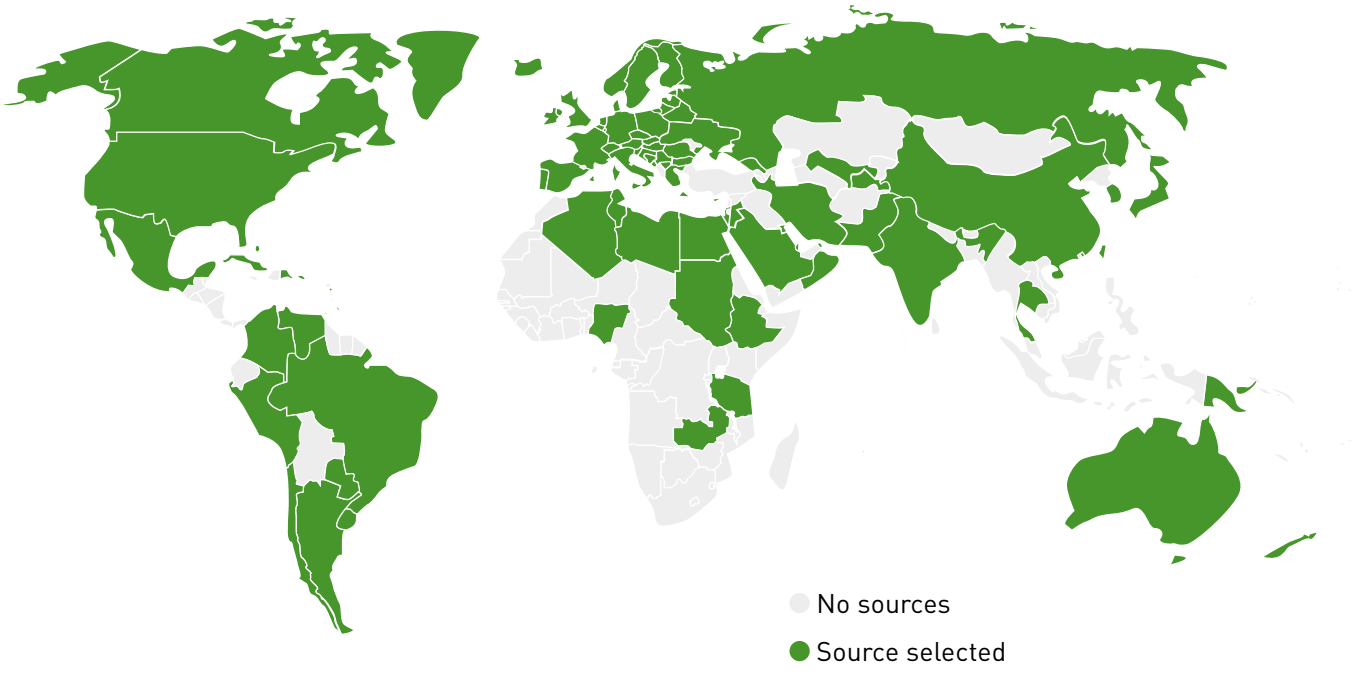
Map 2.9. Number of data sources reviewed with information on diabetes or IGT in adults



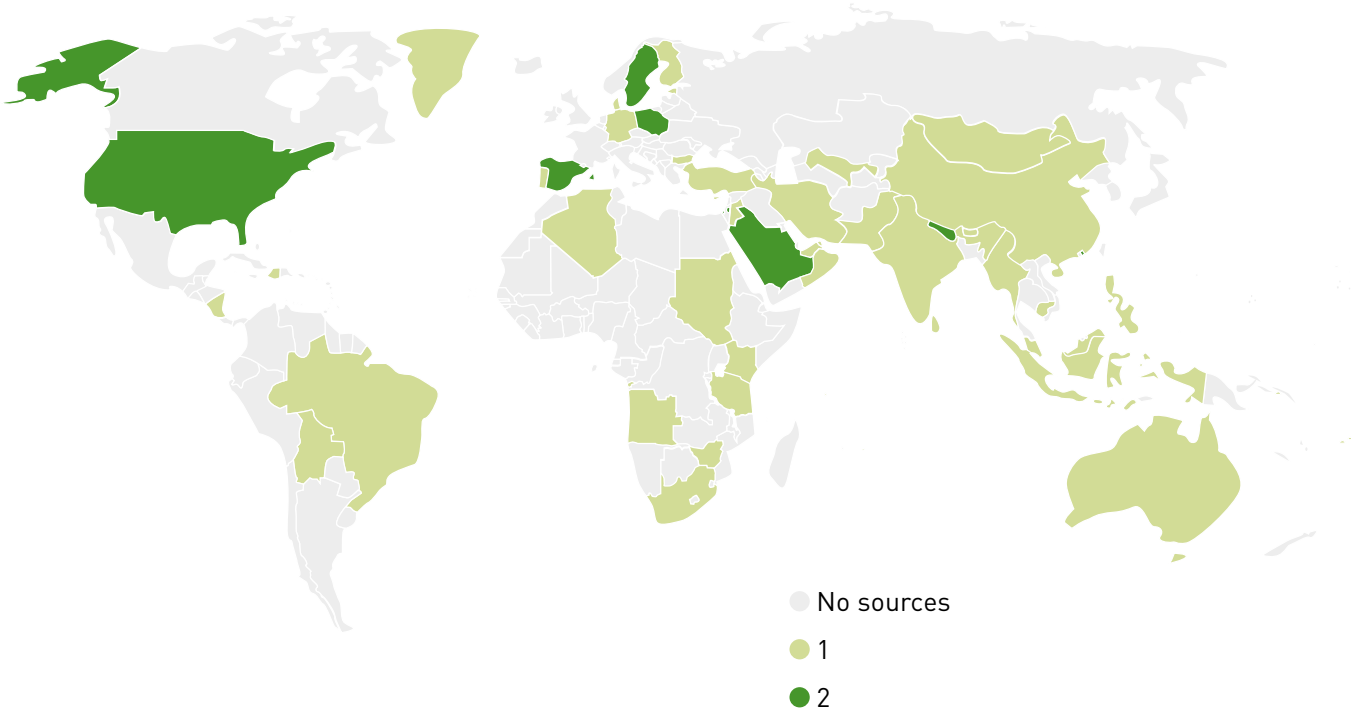
Map 2.10. Number of data sources selected for diabetes estimates in adults



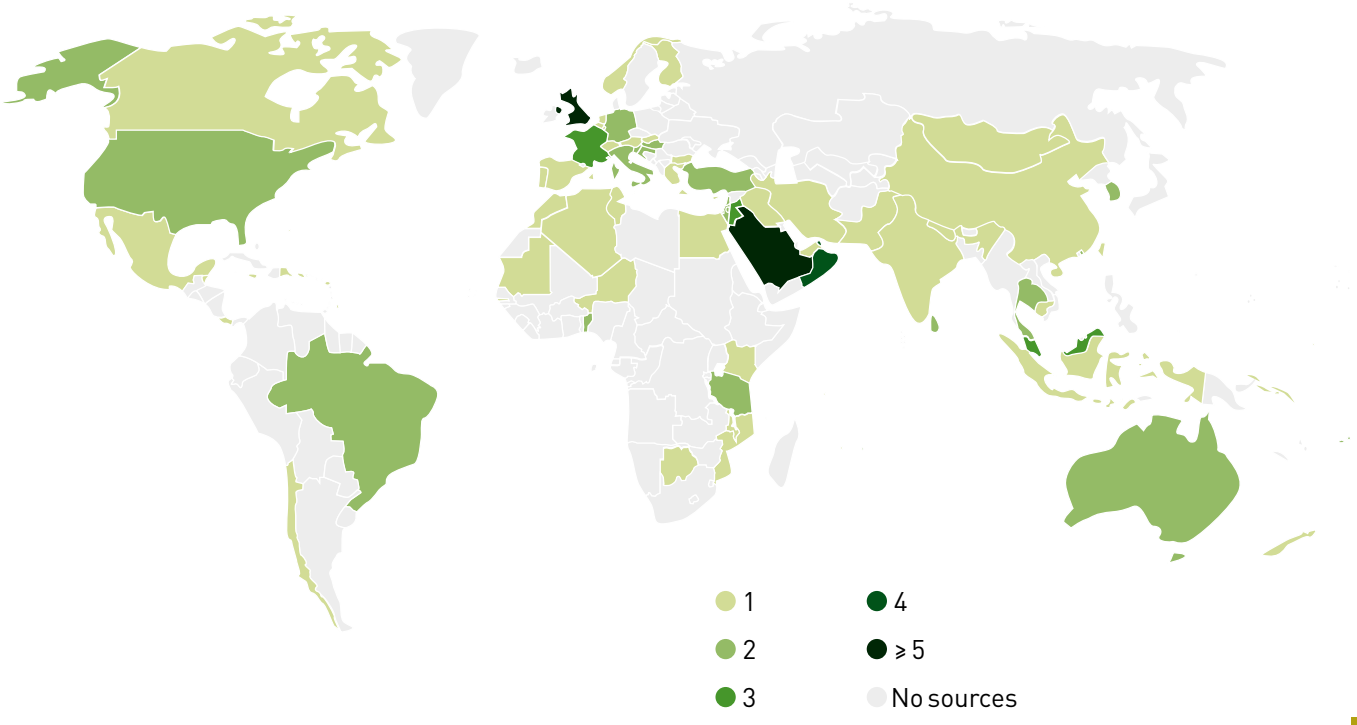
Map 2.11. Geographical origin of data sources selected for diabetes estimates in the young



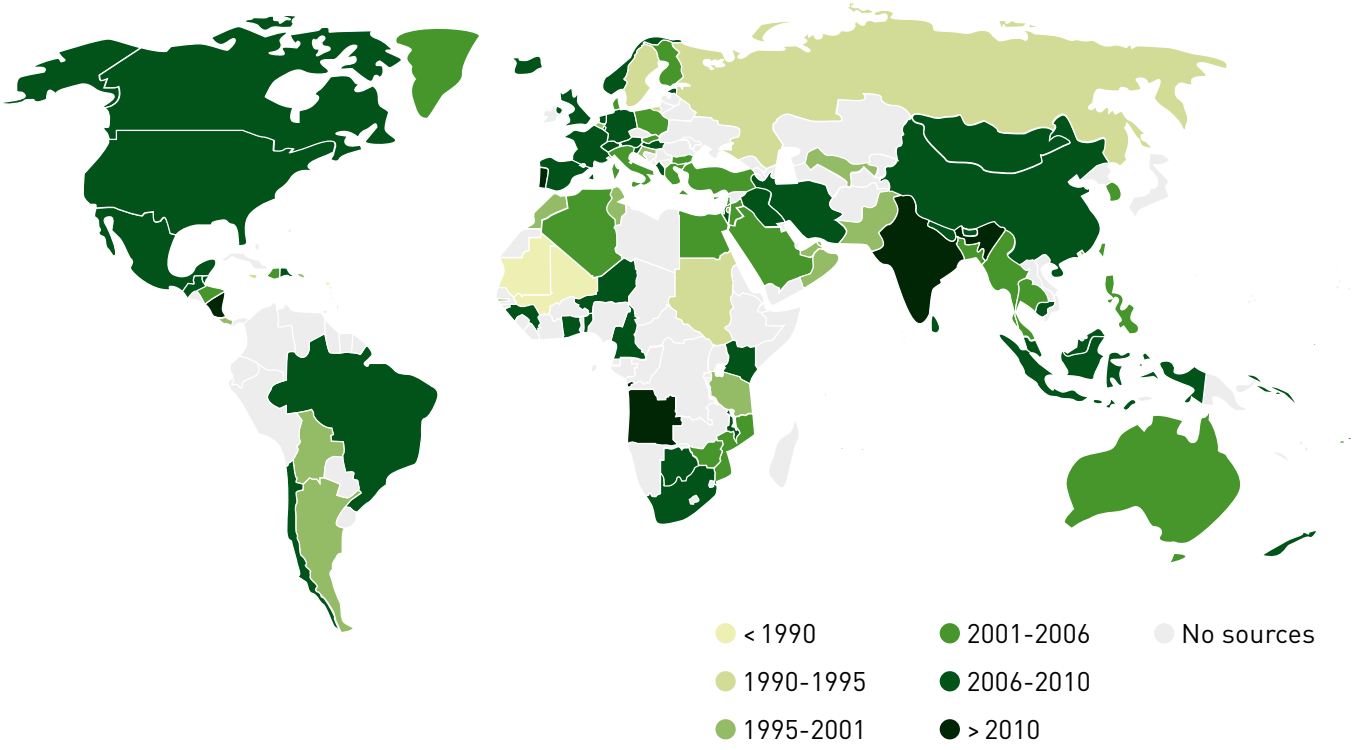
Map 2.12. Number of data sources selected for impaired glucose tolerance estimates (20-79 years)



Map 2.13. Number of nationally representative data sources selected for diabetes estimates in adults



Map 2.14. Year of most recent data sources for estimates of diabetes in adults



3 Regional overviews

- Africa: **78%** of people with diabetes are **undiagnosed**
- Europe: the **highest prevalence of type 1** diabetes in children
- Middle East and North Africa: **6 of the top 10** countries by diabetes prevalence
- North America and Caribbean: **1 adult in 10** has diabetes
- South and Central America: **12.3% of all deaths** were due to diabetes
- South-East Asia: almost **one-fifth** of the world's people with diabetes live in just **seven countries**
- Western Pacific: **132 million adults** have diabetes, the largest number of any region

3 Regional overviews

An overview of all regions

Most people with diabetes live in the economically less developed regions of the world. Even in the region with the lowest prevalence (Africa) it is estimated that around 280,000 deaths are attributable to diabetes in 2011. While more than 80% of people with diabetes live in low- and middle-income countries only 20% of global healthcare expenditures on diabetes were spent in these countries, reflecting huge disparities.

An overview of each of 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), Western Pacific (WP) – is presented here to allow for a better understanding of the diabetes burden and its consequences. Each region is highly diverse not only in socio-economic and geographical terms but also in diabetes prevalence, mortality and healthcare. On the following pages more information is provided about each region.

Diabetes and impaired glucose tolerance (IGT) prevalence

The Western Pacific Region has the largest number of people with diabetes with 132 million while the Africa Region the smallest number with 14.7 million in 2011. However, the Middle East and North Africa Region has the highest prevalence of adults with diabetes at 11% in 2011, followed closely by the North America and Caribbean Region at 10.7%. After the Africa Region, the prevalence of the Europe Region is the lowest at 6.7% (Table 3.1).

The picture is similar for IGT. The Western Pacific Region is estimated to have the greatest number of people with some 85 million in 2011, although the North America and Caribbean Region has the highest comparative prevalence of IGT (10.7%). Overall, the prevalence of IGT was generally lower than that of diabetes, except in the Europe and the North America and Caribbean Regions which have a higher prevalence.

Mortality

Mortality attributable to diabetes ranges from 6.1% of all deaths in those aged 20-79 years in the Africa Region to over 15% in the Western Pacific Region. Beyond 49 years of age, diabetes constituted a higher proportion of all deaths in women than in men in all regions, reaching over 20% of all deaths in some regions and age groups (Section 2.4). These estimates suggest that diabetes is a considerable cause of death and investing in reducing this burden is justified and necessary.

Healthcare expenditures

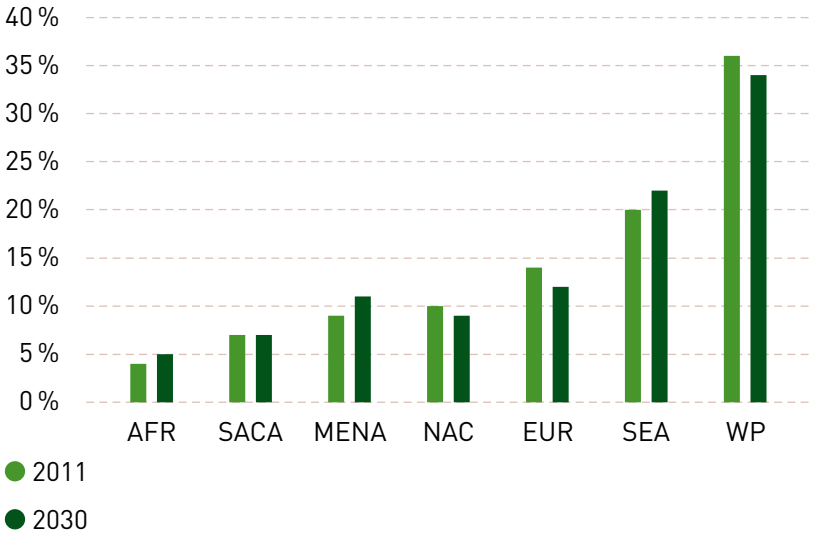
The disparities between the regions can clearly be seen in the healthcare expenditures for diabetes. The North America and Caribbean Region spent an estimated USD 223 billion or 48% of the global healthcare expenditures for diabetes in 2011. The Europe Region spent about half that amount at USD 130 billion. These two regions combined had the highest expenditures due to diabetes in 2011.

In comparison, the Western Pacific Region spent only USD 72 billion on diabetes healthcare despite having the largest number of people with diabetes. The South and Central America and Middle East and North Africa Regions each spent less than 5% of the global total on healthcare expenditures due to diabetes, while the South-East Asia and Africa Regions spent less than 1% in 2011.

Table 3.0. Regional estimates for diabetes (20-79 years), 2011 and 2030

	2011			2030			Increase in the no. of people with diabetes
REGION	Population MILLIONS	No. of people with diabetes MILLIONS	Comparative diabetes prevalence %	Population MILLIONS	No. of people with diabetes MILLIONS	Comparative diabetes prevalence %	%
AFR	387	14.7	4.5	658	28.0	4.9	90
EUR	653	52.8	6.7	673	64.2	6.9	22
MENA	356	32.6	11.0	539	59.7	11.3	83
NAC	322	37.7	10.7	386	51.2	11.2	36
SACA	289	25.1	9.2	376	39.9	9.4	59
SEA	856	71.4	9.2	1,188	120.9	10.0	69
WP	1,544	131.9	8.3	1,766	187.9	8.5	42
World	**4,407**	**366.2**	**8.5**	**5,586**	**551.8**	**8.9**	**51**

Figure 3.0. Percentage of total cases of diabetes (20-79 years) by IDF region, 2011 and 2030



3.1. Africa (AFR)

Health in sub-Saharan Africa has been traditionally dominated by infectious disease, HIV/AIDS, and poverty. With rapid urbanisation, non-communicable diseases (NCDs) like diabetes are quickly becoming a new priority for health in the region. Indeed, age-specific prevalence estimates of diabetes in African urban centres often meet or exceed those found in high-income countries. As urbanisation increases and the population ages, diabetes will pose an even greater threat. The Africa Region also has the highest proportion of undiagnosed diabetes, at least 78% (Section 2.2). An estimated 344,000 deaths in the region can be attributed to diabetes. This represents 6.1% of deaths from all causes. 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 healthcare expenditures due to diabetes.

Prevalence

In 2011, 14.7 million adults in the Africa Region are estimated to have diabetes, with a regional prevalence of 3.8%. The range of prevalence (%) figures between countries reflects the rapid transition communities in the region are facing. The highest prevalence of diabetes in the Africa Region is in the island of Réunion (16.3%), followed by Seychelles (12.4%), Botswana (11.1%) and Gabon (10.6%). Some of Africa's most populous countries also have the highest number of people with diabetes, with Nigeria having the largest number (3.0 million), followed by South Africa (1.9 million), Ethiopia (1.4 million), and Kenya (769,000). The top six countries with the highest number of people with diabetes make up just over half of the total number in the region.

Children in the region with type 1 diabetes often go undiagnosed. Even if diagnosed, few have sufficient access to insulin, syringes, and monitoring equipment and die as a result. This early mortality plays a significant role in the low prevalence of type 1 diabetes in the region.

Mortality

Although only 6.1% of all deaths in the Africa Region can be attributed to diabetes, a staggering 72.8% of those deaths occurred in people under the age of 60. Furthermore, there were more than twice as many deaths in women from diabetes compared to men. This is in part because men are more likely to die from other causes.

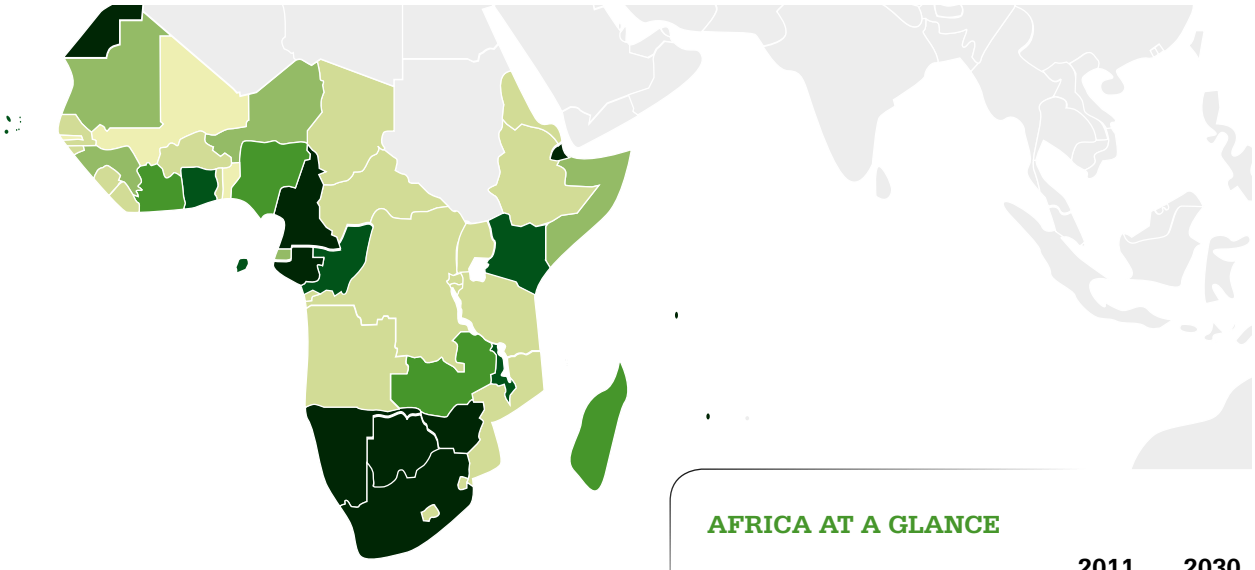
Healthcare expenditures

Estimates for the Africa Region indicate that at least USD 2.8 billion was spent on healthcare due to diabetes in 2011. This expenditure due to diabetes is expected to rise by 61% by 2030, whereas the prevalence of diabetes is projected to almost double in the same time period. Currently, the Africa Region has the lowest total healthcare expenditures due to diabetes of any of the IDF Regions. Therefore, a doubling in the prevalence without a matched increase in expenditures will almost certainly adversely affect diabetes-related care.

Data sources

The number of data sources examining the prevalence of diabetes in adults in the region has substantially increased in recent years. For this edition of the *IDF Diabetes Atlas*, 52 sources from 27 countries were considered, with a total of 21 sources selected from 19 countries. However, data for estimating the numbers of children with type 1 diabetes are still very scarce. There is a great need for further epidemiological investigation and improvement of data collection systems in the region. This need is partly reflected in the high proportion of diabetes that is undiagnosed and found only at the time of surveying.

Map 3.1. Prevalence*(%) estimates of diabetes (20-79 years), 2011, Africa Region



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2.5-4
4-4.5
4.5-5
5-6
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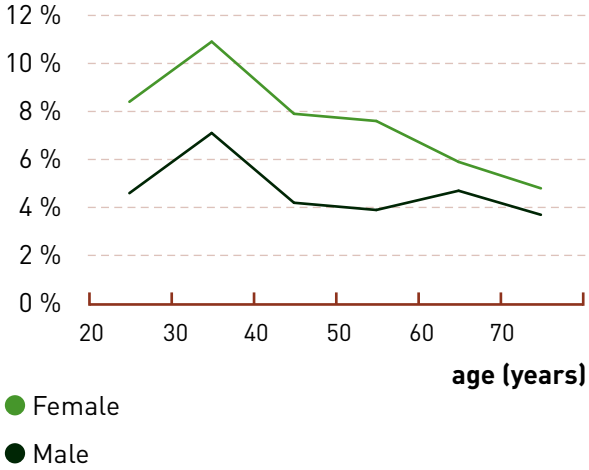
*comparative prevalence

AFRICA AT A GLANCE

	2011	2030
Total population (millions)	**832**	**1,286**
Adult population (20-79 years, millions)	**387**	**658**
DIABETES (20-79 YEARS)		
Regional prevalence (%)	**3.8**	**4.3**
Comparative prevalence (%)*	**4.5**	**4.9**
Number of people with diabetes (millions)	**14.7**	**28.0**
IGT (20-79 YEARS)		
Regional prevalence (%)	**8.5**	**9.6**
Comparative prevalence (%)*	**9.7**	**10.7**
Number of people with IGT (millions)	**32.8**	**63.2**
TYPE 1 DIABETES (0-14 YEARS)		
Number of children with type 1 diabetes (thousands)	**36.1**	
Number of newly-diagnosed cases per year (thousands)	**5.9**	
DIABETES MORTALITY (20-79 YEARS)		
Number of deaths, men (thousands)	**138.0**	
Number of deaths, women (thousands)	**206.5**	
HEALTHCARE EXPENDITURES DUE TO DIABETES (20-79 YEARS, USD)		
Total healthcare expenditures, R=2*, (billions)	**2.8**	**4.5**

*see Glossary

Figure 3.1. Percentage of all-cause mortality attributable to diabetes by age and sex, 2011, Africa Region



3.2. Europe (EUR)

The 54 countries and territories in the Europe Region comprise diverse populations with different levels of affluence. Gross domestic product (GDP) varies from over USD 81,000 per capita for Luxembourg to less than USD 2,000 for several eastern European countries.[1]

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

Prevalence

The number of people with diabetes in this vast region in 2011 is estimated to be 52.8 million, or 8.1% of the adult population. The country with the highest prevalence (10.0%) and the greatest number of people with diabetes (12.6 million) is the Russian Federation, whereas Moldova has an estimated prevalence of diabetes of just 2.8%. After the Russian Federation, the countries with the highest prevalence (%) are Portugal, Cyprus, Poland, Armenia, and Belarus. Conversely, the countries with the highest number of people with diabetes are mostly in western Europe, including Germany, Italy, France, the United Kingdom, and Spain.

Age is an important risk factor for type 2 diabetes. In the Europe Region in 2011, a third of the population of the region are over 50 years of age, and this is expected to increase to over 40% by 2030. To a large degree the high prevalence of type 2 diabetes and impaired glucose tolerance (IGT) is a consequence of the ageing of the region's population.

The Europe Region has the highest number of type 1 diabetes in children of any region. There are about 116,100 children with type 1 diabetes in this region in 2011. The region also has one of the highest incidence rates of type 1 diabetes in children, with 17,900 new cases in 2011. The countries making the largest contribution to the overall numbers in type 1 diabetes in the young are the United Kingdom, the Russian Federation, and Germany.

Mortality

One in 10 deaths in adults in the Europe Region can be attributed to diabetes, representing 600,000 people in 2011. The vast majority (90%) of these deaths were in those over the age of 50, which partly reflects the age distribution of the population but may also 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 (317,600 vs 282,400 respectively).

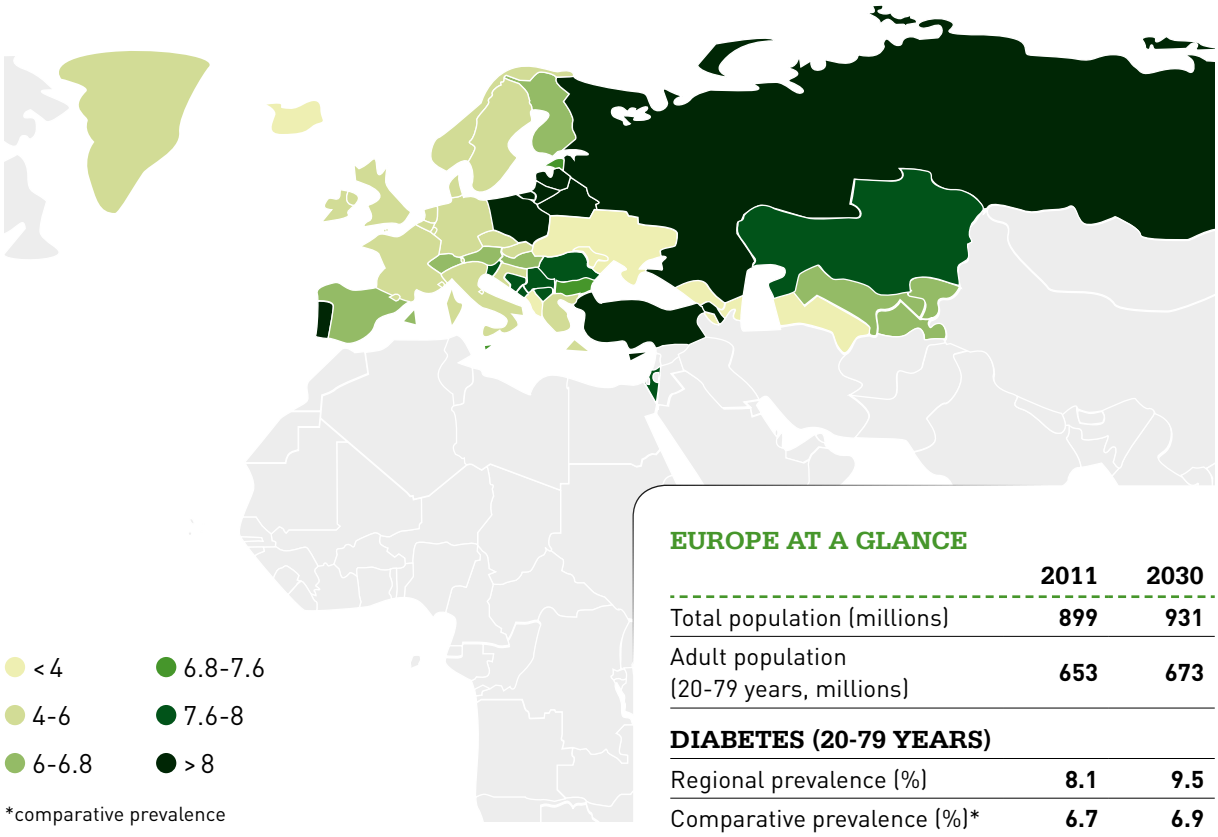
Healthcare expenditures

Estimates indicate that at least USD 131 billion was spent on healthcare due to diabetes in the Europe Region in 2011, accounting for almost one-third of global healthcare expenditures due to diabetes. Just as there is wide variation in the prevalence of diabetes in the region, the range of mean diabetes-related expenditures per person with diabetes between countries is large as well, from USD 9,300 in Luxembourg to just USD 61 in Tajikistan.

Data sources

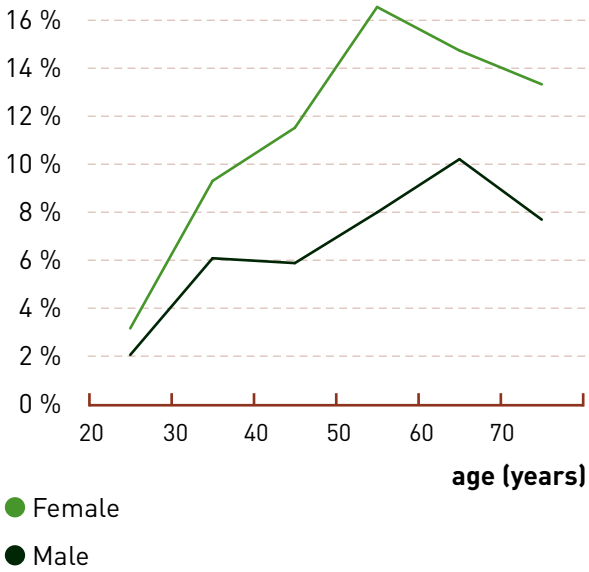
A total of 52 sources from 31 out of the 54 countries in the region were used to generate estimates for diabetes in adults, and 16 for estimates of IGT. Surprisingly there is a paucity of population-based data from many of the more affluent countries of the region, despite being some of the most resource-rich countries in the world. The region has by far the most complete and reliable data for type 1 diabetes in children with a large proportion of countries having registries that were either nationwide or covered several different parts of a country.

Map 3.2. Prevalence*(%) estimates of diabetes (20-79 years), 2011, Europe Region



*comparative prevalence

Figure 3.2. Percentage of all-cause mortality attributable to diabetes (20-79 years) by age and sex, 2011, Europe Region



EUROPE AT A GLANCE

	2011	2030
Total population (millions)	**899**	**931**
Adult population (20-79 years, millions)	**653**	**673**
DIABETES (20-79 YEARS)		
Regional prevalence (%)	**8.1**	**9.5**
Comparative prevalence (%)*	**6.7**	**6.9**
Number of people with diabetes (millions)	**52.8**	**64.2**
IGT (20-79 YEARS)		
Regional prevalence (%)	**9.6**	**10.6**
Comparative prevalence (%)*	**8.6**	**8.5**
Number of people with IGT (millions)	**63.0**	**71.5**
TYPE 1 DIABETES (0-14 YEARS)		
Number of children with type 1 diabetes (thousands)	**116.1**	
Number of newly-diagnosed cases per year (thousands)	**17.9**	
DIABETES MORTALITY (20-79 YEARS)		
Number of deaths, men (thousands)	**282.4**	
Number of deaths, women (thousands)	**317.6**	
HEALTHCARE EXPENDITURES DUE TO DIABETES (20-79 YEARS, USD)		
Total healthcare expenditures, R=2*, (billions)	**130.6**	**157.0**

*see Glossary

3.3. Middle East and North Africa (MENA)

Six out of the world's top ten countries with the highest prevalence (%) of diabetes are in the Middle East and North Africa Region – Kuwait, Lebanon, Qatar, Saudi Arabia, Bahrain, and the United Arab Emirates. The region has the highest comparative prevalence of diabetes (11%). Rapid economic development coupled with ageing populations have resulted in a dramatic increase in the prevalence of diabetes.

Over the past three decades, major social and economic changes have occurred in the majority of the countries in the region. These include progressive urbanisation, decreased infant mortality and increasing life expectancy. With this rapid development, especially among the more wealthy oil-producing countries, come significant changes involving poor nutrition, decreased physical activity, increased obesity and smoking.[1, 2]

Prevalence

In 2011, 32.6 million people or 9.1% of the adult population have diabetes. This number will almost double to 59.7 million in less than 20 years. The explosion of diabetes in the region is mainly due to type 2 diabetes. The prevalence (%) in the region for younger age groups is substantially higher than the global average. A further 24 million people, or 6.7% of the population, are at high risk of diabetes from impaired glucose tolerance (IGT). This number is expected to nearly double by 2030 as well.

By far the largest contribution to the total number of children with type 1 diabetes comes from Saudi Arabia whose estimates account for almost a quarter of the region's total of 64,900.

Mortality

Just over 10% of all deaths in adults in the region are attributable to diabetes. This represents nearly 280,000 deaths in 2011. Deaths due to diabetes are evenly split between men (139,600) and women (136,800). Just under half of all deaths attributable to diabetes for the region occur in people under the age of 60. Early death from diabetes may be a result of the rapidly changing environments and lifestyles of the region, late diagnosis, and health systems which are not equipped to keep up with the growing burden.

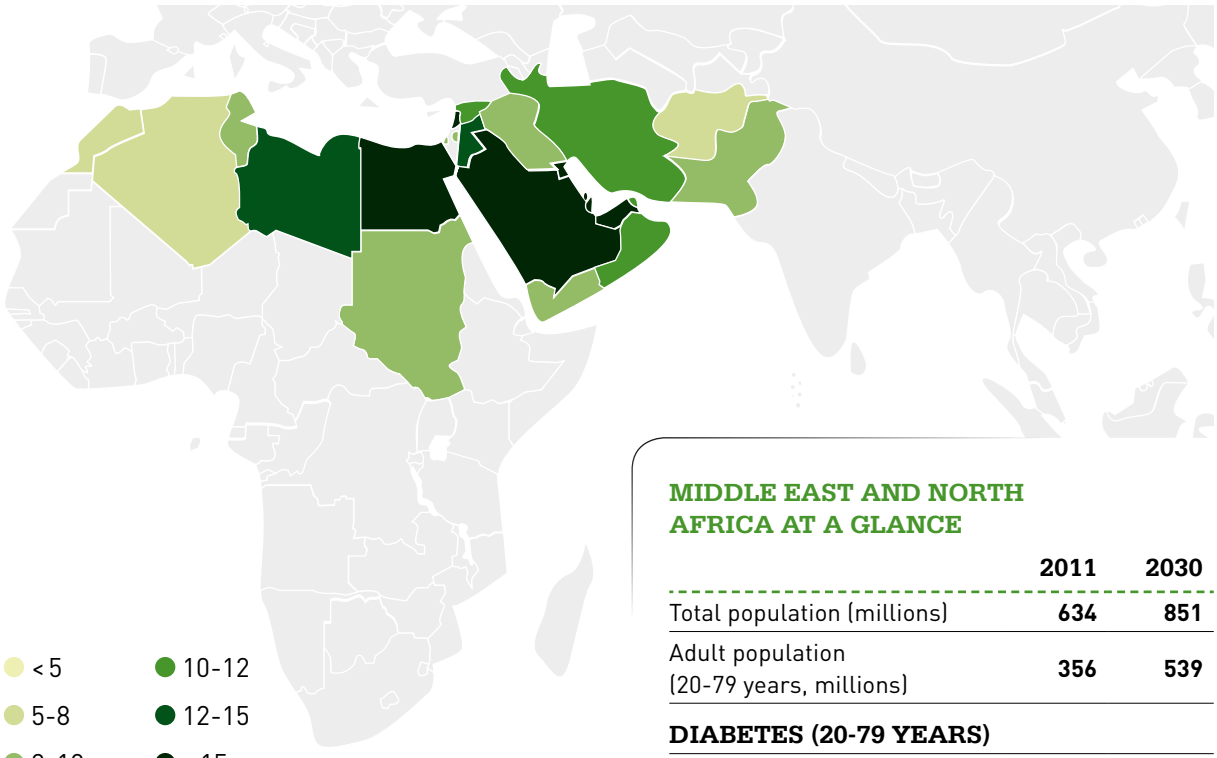
Healthcare expenditures

In spite of the high estimates of diabetes prevalence in the region the total healthcare expenditures for diabetes is expected to be only USD 10.9 billion in 2011. Healthcare expenditures due to diabetes in the region account for just 2.3% of the total global figure. However, these expenditures are expected to double by 2030.

Data sources

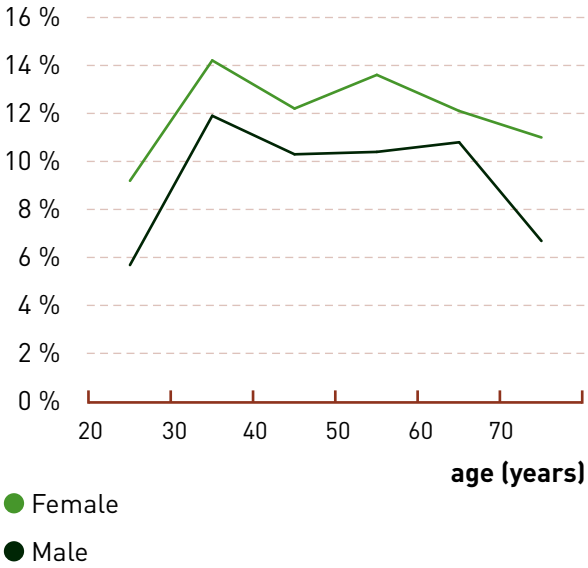
In total, 25 sources from 14 countries, many of which were new for this edition, were used to estimate diabetes prevalence in adults. Reliable data for type 1 diabetes in children were also available in a number of countries in this region. The Middle East and North Africa Region poses a particular challenge for estimating prevalence of diabetes because a large proportion of the resident population in many countries is made up of migrants. As a result, studies that only include nationals from a country are limited in their ability to represent a complete 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), 2011, Middle East and North Africa Region



*comparative prevalence

Figure 3.3. Percentage of all-cause mortality attributable to diabetes (20-79 years) by age and sex, 2011, Middle East and North Africa Region



MIDDLE EAST AND NORTH AFRICA AT A GLANCE

	2011	2030
Total population (millions)	**634**	**851**
Adult population (20-79 years, millions)	**356**	**539**
DIABETES (20-79 YEARS)		
Regional prevalence (%)	**9.1**	**11.1**
Comparative prevalence (%)*	**11.0**	**11.3**
Number of people with diabetes (millions)	**32.6**	**59.7**
IGT (20-79 YEARS)		
Regional prevalence (%)	**6.7**	**7.6**
Comparative prevalence (%)*	**7.6**	**7.7**
Number of people with IGT (millions)	**23.9**	**41.0**
TYPE 1 DIABETES (0-14 YEARS)		
Number of children with type 1 diabetes (thousands)	**64.9**	
Number of newly-diagnosed cases per year (thousands)	**10.8**	
DIABETES MORTALITY (20-79 YEARS)		
Number of deaths, men (thousands)	**139.6**	
Number of deaths, women (thousands)	**136.8**	
HEALTHCARE EXPENDITURES DUE TO DIABETES (20-79 YEARS, USD)		
Total healthcare expenditures, R=2*, (billions)	**10.9**	**21.8**

*see Glossary

3.4. North America and Caribbean (NAC)

The North America and Caribbean Region has the second highest comparative prevalence of diabetes with 10.7% of the adult population affected. The majority of the population in the region lives in the United States of America (USA), Mexico, and Canada, which account for the vast majority of people with diabetes. However, the prevalence (%) of diabetes among adults in the Caribbean islands is generally high and consistently above the global average.

Prevalence

In 2011, an estimated 37.7 million people with diabetes live in this region, and by 2030 the number is expected to increase by more than a third to 51.2 million. Belize, Guyana, Jamaica, and Mexico have the highest prevalence (%) of diabetes in the region. Meanwhile the USA, with 23.7 million, has the highest number of people with diabetes followed by Mexico, Canada, and Haiti. A further 36.9 million people in 2011 or 11.5% of adults in the region have impaired glucose tolerance (IGT), putting them at high risk for developing type 2 diabetes. This number is expected to increase to 47.2 million by 2030.

A large proportion of the burden of diabetes and IGT in the USA and Canada can be attributed to the ageing of the population. In 2011, 28.5% of the region's population are over 50 years of age, and this is expected to rise to 34.3% by 2030.[1] By contrast, only 18% of the populations in Mexico and the Caribbean countries are over 50. However, the proportions of people over the age of 50 for those countries are expected to increase to 29% and 24%, respectively by 2030.

There are an estimated 94,700 children with type 1 diabetes in the region. The USA estimate accounts for almost 90% of the total number of new cases of type 1 diabetes in children, followed by Canada.

Mortality

Diabetes is responsible for 13.8% of all deaths in adults, or 281,000 people, in the region. More men (151,000) than women (130,000) died from diabetes-related causes in the region in 2011. Nearly two-thirds (59%) of all deaths due to diabetes occurred in adults over the age of 60. The USA has one of the highest numbers of deaths due to diabetes of any country in the world (180,000).

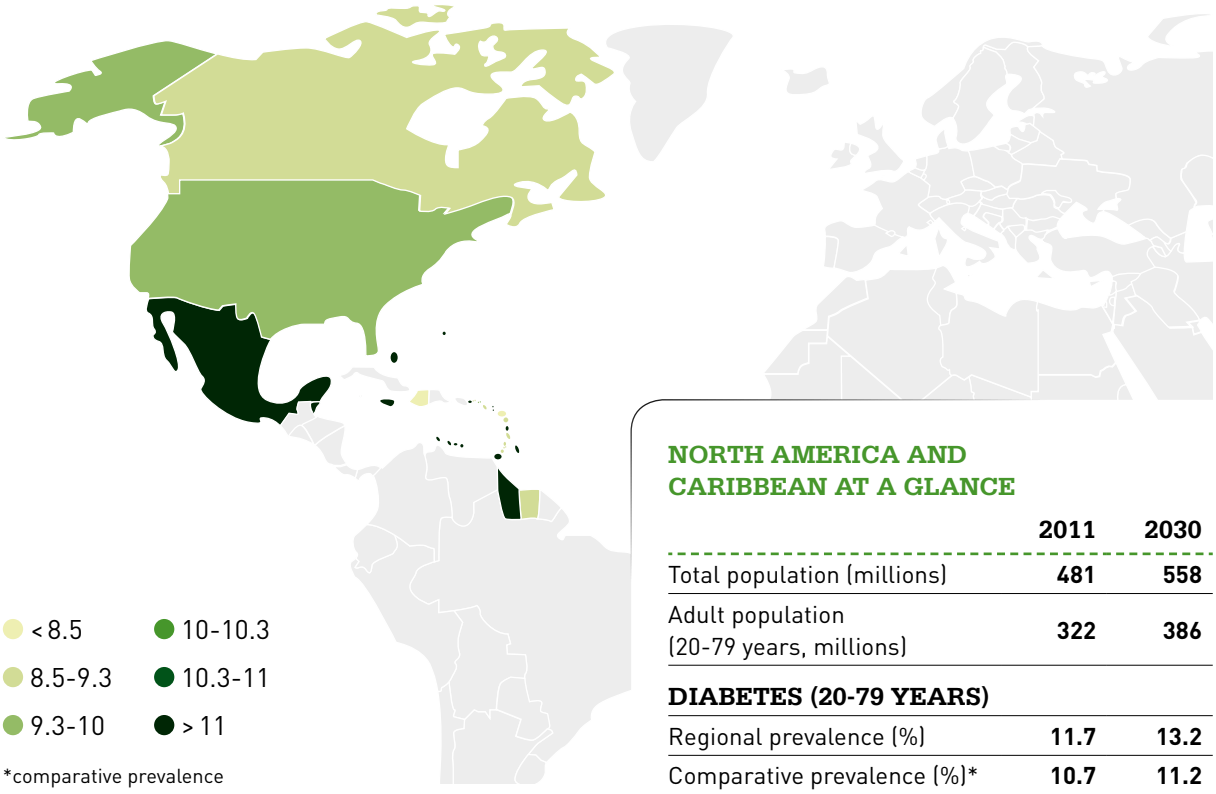
Healthcare expenditures

Healthcare expenditures due to diabetes in the region are estimated to account for almost half (48%) of global diabetes-related healthcare spending. The USA alone accounts for most of the USD 223 billion spent in the region in 2011. Except for the USA (USD 8,468) and Canada (USD 5,106), mean diabetes-related expenditures per person with diabetes are low for almost every other country in the region. The majority of Caribbean islands spend less that USD 1,000 on care per person with diabetes, and Haiti spends just USD 68. Healthcare spending due to diabetes is expected to increase by 20% by 2030, the smallest increase of any region.

Data sources

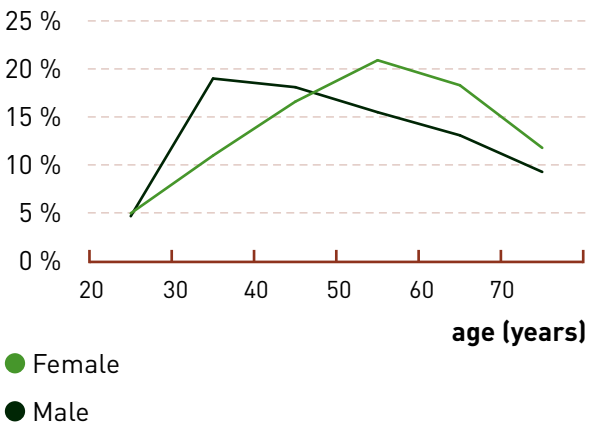
The estimates for diabetes in adults were taken from 12 data sources in the region representing 10 out of 26 countries. Large national data collection systems in the USA and Canada provide representative information on the number of people with diabetes. However, the availability of similar data sources 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), 2011, North America and Caribbean Region



*comparative prevalence

Figure 3.4. Percentage of all-cause mortality attributable to diabetes (20-79 years) by age and sex, 2011, North America and Caribbean Region



NORTH AMERICA AND CARIBBEAN AT A GLANCE

	2011	2030
Total population (millions)	**481**	**558**
Adult population (20-79 years, millions)	**322**	**386**
DIABETES (20-79 YEARS)		
Regional prevalence (%)	**11.7**	**13.2**
Comparative prevalence (%)*	**10.7**	**11.2**
Number of people with diabetes (millions)	**37.7**	**51.2**
IGT (20-79 YEARS)		
Regional prevalence (%)	**11.5**	**12.2**
Comparative prevalence (%)*	**10.7**	**10.6**
Number of people with IGT (millions)	**36.9**	**47.2**
TYPE 1 DIABETES (0-14 YEARS)		
Number of children with type 1 diabetes (thousands)	**94.7**	
Number of newly-diagnosed cases per year (thousands)	**14.6**	
DIABETES MORTALITY (20-79 YEARS)		
Number of deaths, men (thousands)	**150.6**	
Number of deaths, women (thousands)	**130.2**	
HEALTHCARE EXPENDITURES DUE TO DIABETES (20-79 YEARS, USD)		
Total healthcare expenditures, R=2*, (billions)	**223.5**	**283.9**

*see Glossary

3.5. South and Central America (SACA)

The South and Central America Region includes 20 countries and territories, most of which are in economic transition. The countries and territories of the region all have similar age distribution profiles with about 20% of the population estimated to be older than 50 in 2011. This figure is expected to increase to close to 30% by 2030. The region has a markedly younger age distribution than most of North America. However, as urbanisation continues and populations age, diabetes will become an even greater public health priority for the region.

Prevalence

An estimated 25.1 million people, or 8.7% of the adult population, have diabetes in 2011. Over the next 20 years, the number is expected to rise by close to 60% to almost 40 million people. In addition, current estimates indicate another 15.1 million people, or 5.2% of the adult population, have impaired glucose tolerance (IGT) in 2011. Brazil has the highest number of people with diabetes at 12.4 million, followed by Colombia, Venezuela and Argentina. In addition, Puerto Rico has the highest prevalence of diabetes in adults at 13.3%, followed by Nicaragua (11.2%), Venezuela (10.5%) and Brazil (10.4%).

An estimated 5,500 children developed type 1 diabetes in 2011. In total, 36,100 children in the region under the age of 15 have type 1 diabetes. The majority of children with type 1 diabetes are in Brazil with an estimated 25,200 children.

Mortality

In 2011, there were 227,000 deaths, or 12.3% of all deaths in the region, attributable to diabetes among adults. More than half (58%) of these deaths occurred in people over the age of 60, and more in women (124,000) compared to men (103,000). Brazil had by far the greatest number of deaths with 121,000 or just under half of all deaths due to diabetes for the region.

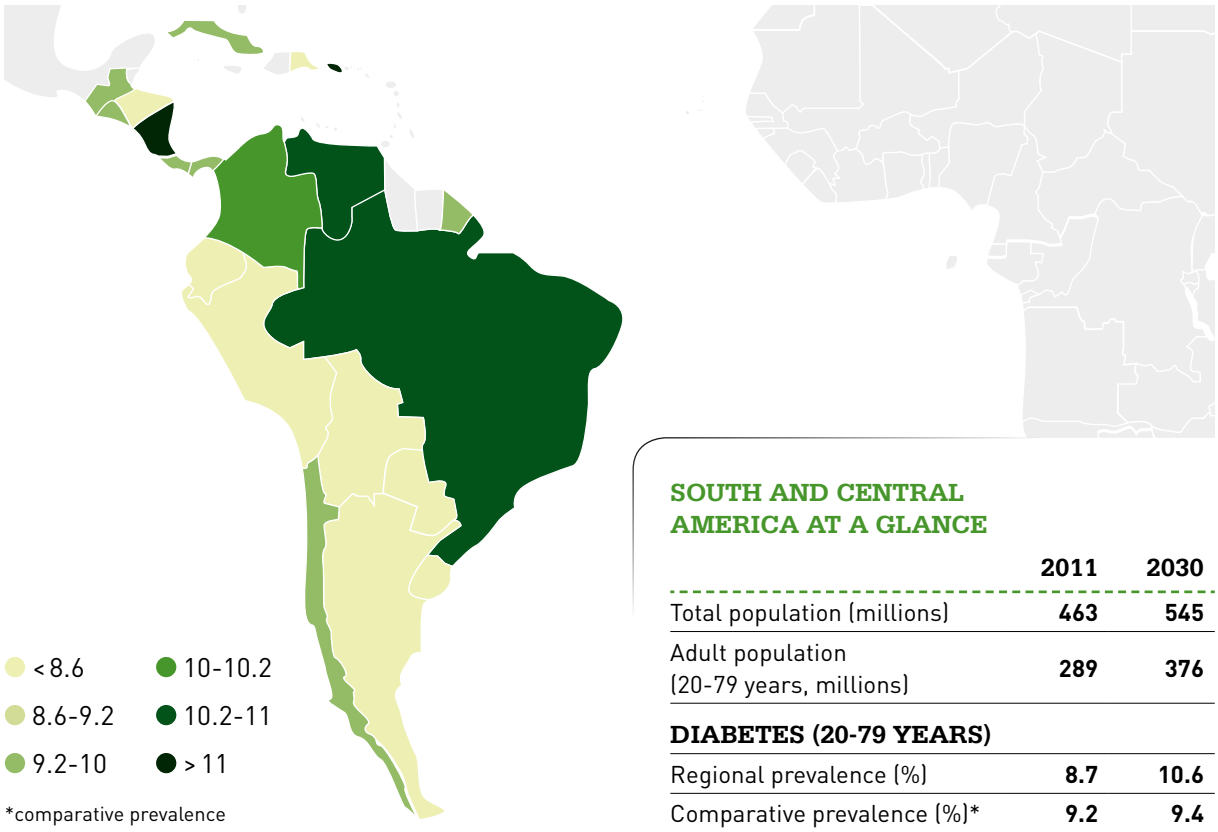
Healthcare expenditures

Healthcare expenditures due to diabetes are estimated at USD 20.8 billion in the region, accounting for 4.5% of the global total. These expenditures will increase to USD 32.9 billion by 2030. The region spends about 13% of its total healthcare expenditures on diabetes in adults (20-79 years).

Data sources

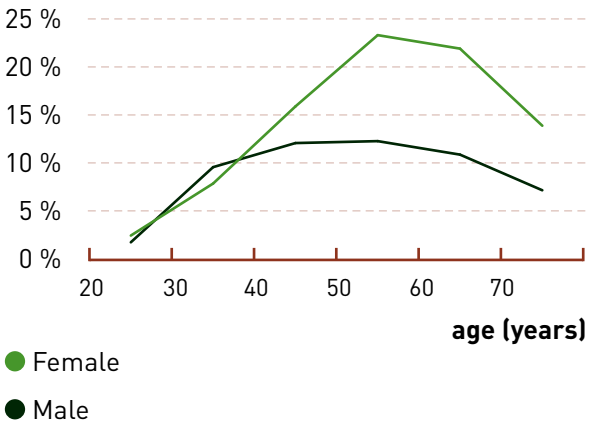
A number of new data sources have been published for diabetes in the region, but lack of indexing and availability makes it hard to obtain the data necessary for modelling. As a result, 11 sources from 10 countries were used to estimate diabetes prevalence. Similarly, there are few sources on the numbers of children with type 1 diabetes for the region.

Map 3.5. Prevalence*(%) estimates of diabetes (20-79 years), 2011, South and Central America Region



*comparative prevalence

Figure 3.5. Percentage of all-cause mortality attributable to diabetes (20-79 years) by age and sex, 2011, South and Central America Region



SOUTH AND CENTRAL AMERICA AT A GLANCE

	2011	2030
Total population (millions)	**463**	**545**
Adult population (20-79 years, millions)	**289**	**376**
DIABETES (20-79 YEARS)		
Regional prevalence (%)	**8.7**	**10.6**
Comparative prevalence (%)*	**9.2**	**9.4**
Number of people with diabetes (millions)	**25.1**	**39.9**
IGT (20-79 YEARS)		
Regional prevalence (%)	**5.2**	**6.0**
Comparative prevalence (%)*	**5.4**	**5.6**
Number of people with IGT (millions)	**15.1**	**22.6**
TYPE 1 DIABETES (0-14 YEARS)		
Number of children with type 1 diabetes (thousands)	**36.1**	
Number of newly-diagnosed cases per year (thousands)	**5.5**	
DIABETES MORTALITY (20-79 YEARS)		
Number of deaths, men (thousands)	**103.3**	
Number of deaths, women (thousands)	**123.9**	
HEALTHCARE EXPENDITURES DUE TO DIABETES (20-79 YEARS, USD)		
Total healthcare expenditures, R=2*, (billions)	**20.8**	**32.9**

*see Glossary

3.6. South-East Asia (SEA)

Although the South-East Asia Region comprises only seven countries, it is one of the most populous regions in the world. The adult population of India alone accounts for 86% of the region's total population of 856 million in 2011. There is a wide gap in per capita GDP, with Mauritius having the highest at USD 14,100, while Nepal has the lowest at less than USD 1,300. Furthermore, India 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 8.3% of the adult population, or 71.4 million people, have diabetes in 2011, 61.3 million of whom are in India. The number of people with diabetes in the region will increase to 120.9 million by 2030, or 10.2% of the adult population. A further 23.8 million people have impaired glucose tolerance (IGT) in 2011, and this will increase to 38.6 million by 2030. Mauritius has the highest prevalence of diabetes among adults for the region at 15.1%, with Bangladesh next at 10.6%. The number of people with diabetes in India, Bangladesh, and Sri Lanka make up 99% of the total for the region.

The estimated increase in regional diabetes prevalence to 10.2% in 2030 is a consequence of increasing life expectancy in India (the proportion of the population over 50 years is expected to increase from 16% to 23% from 2011 to 2030), and of rapid urbanisation.

The South-East Asia Region has one of the highest estimates of prevalence of type 1 diabetes in children, with 111,500 affected. In 2011, an estimated 18,000 children under the age of 15 in the region developed type 1 diabetes.

India accounts for most of the children with type 1 diabetes in the region. The incidence rate for type 1 diabetes in India was frequently used in extrapolation for other countries in the region and therefore plays a pivotal role in the estimates. The large childhood population in India and the widespread use of the Indian data for extrapolation have important consequences not only for the regional total but also for the worldwide estimates. This region contributes more than any other to the worldwide total.

Mortality

The region has the second highest number of deaths attributable to diabetes of any of the seven IDF Regions with 1.16 million deaths in 2011. This represents 14.5% of all deaths for the region among adults. More than half (55%) of these deaths occur in people under the age of 60 and almost a third (27%) under the age of 50. India is the largest contributor to regional mortality with 983,000 deaths attributable to diabetes.

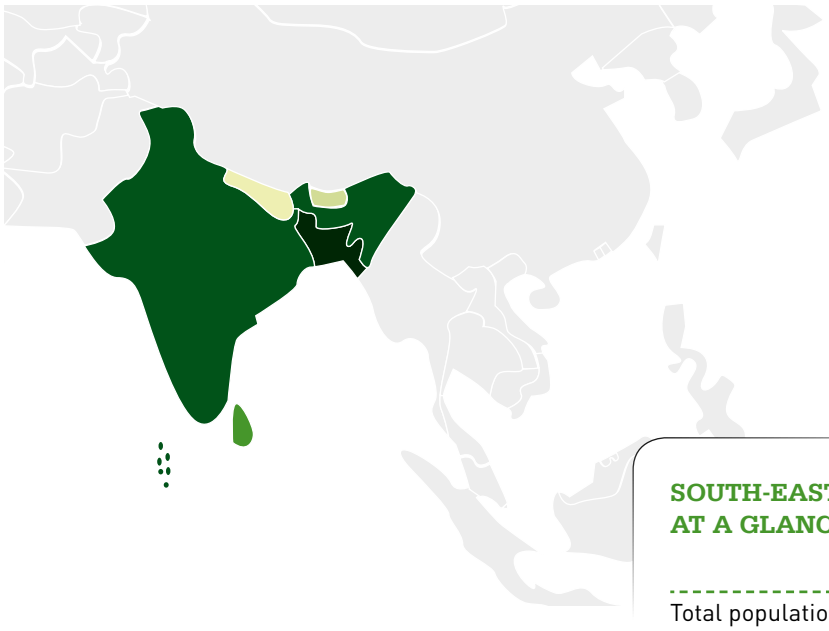
Healthcare expenditures

In spite of the large number of people with diabetes in the South-East Asia Region, healthcare expenditures due to diabetes are estimated to be only USD 4.5 billion in 2011, accounting for less than 1% of the global total. Most of the estimated spending is expected to occur in India.

Data sources

Six out of the 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 for the diabetes estimates in adults. However, estimates for type 1 diabetes in children are largely based on data from India.

Map 3.6. Prevalence*(%) estimates of diabetes (20-79 years), 2011, 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. Percentage of all-cause mortality attributable to diabetes (20-79 years) by age and sex, 2011, South-East Asia Region

SOUTH-EAST ASIA AT A GLANCE

	2011	2030
Total population (millions)	**1,446**	**1,771**
Adult population (20-79 years, millions)	**856**	**1,188**
DIABETES (20-79 YEARS)		
Regional prevalence (%)	**8.3**	**10.2**
Comparative prevalence (%)*	**9.2**	**10.0**
Number of people with diabetes (millions)	**71.4**	**120.9**
IGT (20-79 YEARS)		
Regional prevalence (%)	**2.8**	**3.2**
Comparative prevalence (%)*	**3.0**	**3.2**
Number of people with IGT (millions)	**23.8**	**38.6**
TYPE 1 DIABETES (0-14 YEARS)		
Number of children with type 1 diabetes (thousands)	**111.5**	
Number of newly-diagnosed cases per year (thousands)	**18.0**	
DIABETES MORTALITY (20-79 YEARS)		
Number of deaths, men (thousands)	**504.7**	
Number of deaths, women (thousands)	**651.3**	
HEALTHCARE EXPENDITURES DUE TO DIABETES (20-79 YEARS, USD)		
Total healthcare expenditures, R=2*, (billions)	**4.5**	**7.6**

*see Glossary

3.7. Western Pacific (WP)

The world's most populous region, the Western Pacific, has 39 countries and territories with predicted populations for 2011 ranging from 1.3 billion for China to less than 1,500 for the smallest Pacific island nations of Niue and Tokelau. Similarly, the economic profile of countries varies from per capita GDP of over USD 35,000 for Australia, Hong Kong, Taiwan, and Singapore to less than USD 3,000 for the poorest countries.[1]

Prevalence

Some 131.9 million people, or 8.5% of the adult population, are estimated to have diabetes in 2011. Over the next 20 years, the number is expected to increase to 187.9 million, or 10.6% of the adult population. The Western Pacific Region makes up 36% of the total number of people with diabetes in the world. There is a great range in the estimates for prevalence (%) of diabetes in the region, from the world's highest prevalence in the Pacific Island nation of Kiribati (25.7%) to one of the lowest prevalence in Cambodia (2.9%). Pacific island nations have some of the highest diabetes prevalence (%) in the world. Marshall Islands (22.2%), Nauru (20.7%), Tuvalu (19.5%) and Vanuatu (16.4%) closely follow Kiribati as the highest prevalence (%) countries in the region.

China is poised to be overwhelmed by diabetes having the highest number of people with diabetes (90 million) in the world in 2011 with a prevalence of 9.0%. If China continues on its projected trend, the number of people with diabetes will reach 130 million by 2030.

An estimated 30,700 children under the age of 15 in the region have type 1 diabetes in 2011. The largest numbers of children with type 1 diabetes in the region live in China, with 8,700 children, followed closely by the Philippines with 7,800 children. Australia has the highest estimated incidence rate of type 1 diabetes with 22.5 cases per 100,000 children. In 2011, there were 5,000 newly diagnosed children with type 1 diabetes in the Western Pacific Region.

Mortality

The Western Pacific Region also has the highest number of deaths attributable to diabetes in 2011 of any region with 1.7 million deaths among adults or over 15% of all deaths. China alone had 1.1 million deaths due to diabetes in 2011. Substantially more men (973,000) than women (735,000) died of diabetes in 2011 in the region and 46% of diabetes deaths occurred in those under the age of 60.

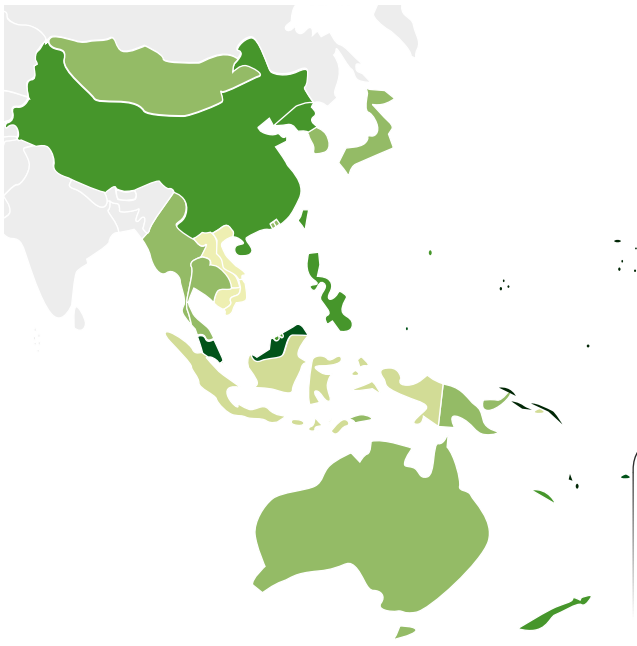
Healthcare expenditures

Expenditures on healthcare due to diabetes in this populous region account for about 15.5% of the global total. At least USD 72.2 billion was spent on diabetes-related care in 2011. The mean diabetes-related spending on healthcare per person with diabetes varied greatly between countries in the region, ranging from more than USD 3,000 in Australia and Japan to less than USD 20 in Myanmar and the Democratic People's Republic of Korea.

Data sources

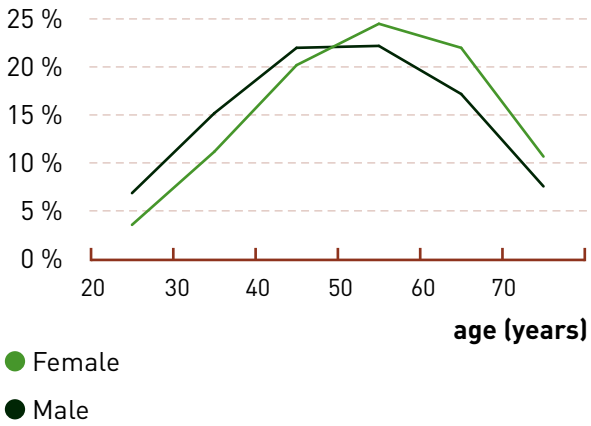
Twenty-eight data sources from 20 countries were used to generate estimates of diabetes in adults for the region. A large new study from China contributed significantly to increases in the diabetes prevalence estimates in the region compared to the previous edition. Estimates for type 1 diabetes in the young were based on 10 studies.

Map 3.7. Prevalence*(%) estimates of diabetes (20-79 years), 2011, Western Pacific Region



*comparative prevalence

Figure 3.7. Percentage of all-cause mortality attributable to diabetes (20-79 years) by age and sex, 2011, Western Pacific Region



WESTERN PACIFIC REGION AT A GLANCE

	2011	2030
Total population (millions)	**2,217**	**2,378**
Adult population (20-79 years, millions)	**1,544**	**1,766**
DIABETES (20-79 YEARS)		
Regional prevalence (%)	**8.5**	**10.6**
Comparative prevalence (%)*	**8.3**	**8.5**
Number of people with diabetes (millions)	**131.9**	**187.9**
IGT (20-79 YEARS)		
Regional prevalence (%)	**5.5**	**6.5**
Comparative prevalence (%)*	**5.4**	**5.7**
Number of people with IGT (millions)	**84.9**	**114.1**
TYPE 1 DIABETES (0-14 YEARS)		
Number of children with type 1 diabetes (thousands)	**30.7**	
Number of newly-diagnosed cases per year (thousands)	**5.0**	
DIABETES MORTALITY (20-79 YEARS)		
Number of deaths, men (thousands)	**973.1**	
Number of deaths, women (thousands)	**735.2**	
HEALTHCARE EXPENDITURES DUE TO DIABETES (20-79 YEARS, USD)		
Total healthcare expenditures, R=2*, (billions)	**72.2**	**87.2**

*see Glossary

Diabetes and development

4

- All nations – **rich and poor** – are suffering the impact of the diabetes epidemic
- Diabetes particularly affects those who are **socially and economically disadvantaged**
- Diabetes increases the **risk of** developing **tuberculosis**
- Diabetes **threatens** achievement of the **Millennium Development Goals**

4 Diabetes and development

4.1. Diabetes in low-, middle- and high-income countries

Diabetes has traditionally been viewed as a disease of rich countries. However, estimates of diabetes prevalence presented in this edition of the *IDF Diabetes Atlas* show that four out of five people with diabetes live in countries classified by the World Bank as low- and middle-income countries. Of the 3.6 billion adults living in low- and middle-income countries in 2011, 291 million have diabetes.[1] This is compared to 75 million adults with diabetes living in high-income countries.

Drivers of the epidemic

The greatest increases in numbers of people with diabetes over the next 20 years will occur in low- and middle-income countries. This is driven by an increase in the adult population, people living longer, and through changes in behaviours associated with rapidly increasing urbanisation and development. Key changes in behaviour include reduced physical activity, a shift to higher calorie diets, and the associated increases in obesity. This transition becomes clearer when breaking down middle-income countries further into upper-middle-income and lower-middle-income. The prevalence of diabetes is higher in upper middle-income countries (10.1%) than in lower middle-income countries (8.6%).

Age distribution

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. This is different from the age distribution found in high-income countries which has many more people with diabetes in older age groups (Figure 4.2). People with poorly managed diabetes or people who do not have access to proper care and treatment are more likely to miss work due to the consequences of the disease, which can lead to lost productivity. This in turn has a negative effect on the economy in those countries.

Changes as economies develop

Figure 4.2 suggests an alarming scenario for lower middle-income countries in particular. With ageing the prevalence in lower middle-income countries is likely to increase and so be higher across all ages than in high-income countries. Currently, in ages 60 and above, the prevalence of diabetes is lower than it is in high-income countries. However, under the age of 60, the prevalence is currently higher than in high-income countries. As these people in lower middle-income countries age, there is likely to be a rapid increase in the prevalence of diabetes in those over the age of 60, shifting the curve towards a distribution more similar to upper middle-income countries.

Furthermore, as upper middle-income country economies develop into high-income economies, it is unlikely that the prevalence of diabetes in those countries will decrease.

Diabetes-related deaths

There are nearly as many deaths due to diabetes in low-income countries (492,000) as in high-income countries (544,000), even though low-income countries have the lowest diabetes prevalence (5.6%) and a smaller adult population (509 million) than high-income countries (789 million). This reflects greater mortality due to diabetes in low-income countries compared to high-income (Figure 4.4). Middle-income countries have by far the largest number of total deaths attributable to diabetes at over 3.5 million deaths.

The comparative mortality rate (20-79 years) due to diabetes in high-income countries (0.51 per 1,000) is less than half of that of low- and middle-income countries (1.22 per 1,000).

Healthcare expenditures

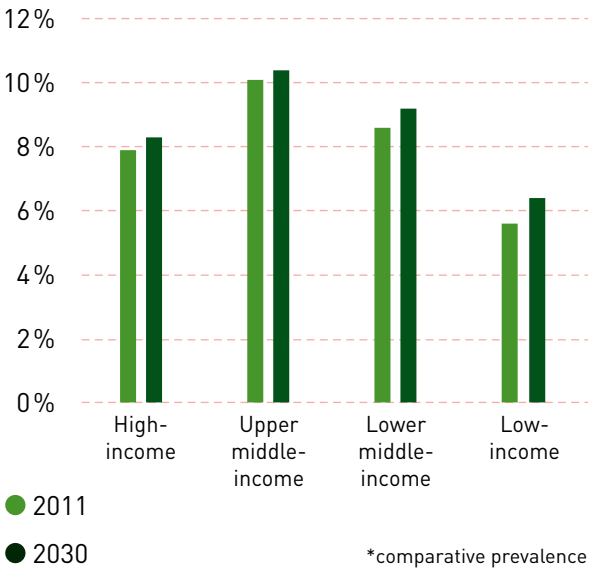
Eighty-two percent of all healthcare expenditures due to diabetes are in high-income countries at USD 383.8 billion in 2011 (Figure 4.5). In contrast, just USD 1.1 billion were spent in low-income countries. A lack of investment in the care and treatment of people with diabetes in low-income countries may explain the difference in expenditures as well as the high relative mortality rate.

Differences within countries

It is essential to the understanding of these differences to look at the drivers of disparities between and within countries. A country-level analysis only gives a snapshot of what is driving new cases of diabetes. Different levels of socio-economic status can mean a very different picture for individuals with diabetes living in a particular environment and the next chapter on the Social Determinants of Diabetes explores these relationships in more depth.

AT A GLANCE	2011	2030
HIGH-INCOME COUNTRIES		
Total population (billions)	**1.1**	**1.2**
Adult population (20-79 years) (millions)	**789**	**846**
Comparative prevalence of diabetes (%)	**7.9**	**8.3**
No. of people with diabetes (millions)	**75.2**	**94.3**
Percent of global diabetes cases (%)	**20.5**	**17.1**
Deaths attributable to diabetes (thousands)	**544.2**	
LOW- AND MIDDLE-INCOME COUNTRIES		
Total population (billions)	**5.9**	**7.1**
Adult population (20-79 years) (millions)	**3,620**	**4,740**
Comparative prevalence of diabetes (%)	**8.6**	**9.0**
No. of people with diabetes (millions)	**291.1**	**457.6**
Percent of global diabetes cases (%)	**79.5**	**82.9**
Deaths attributable to diabetes (thousands)	**4,049.0**	

Figure 4.1. Prevalence* (%) estimates of diabetes (20-79 years) by income group, 2011 and 2030



*comparative prevalence

Figure 4.2. Prevalence (%) estimates of diabetes (20-79 years) by income group and age, 2011

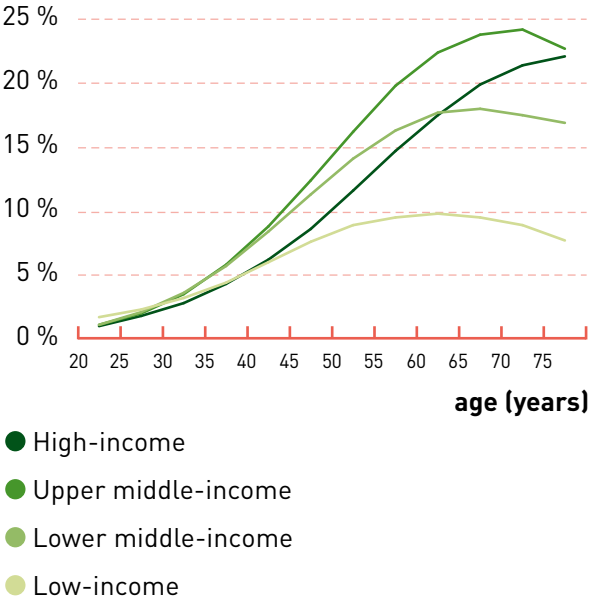


Figure 4.3. Number of deaths attributable to diabetes (20-79 years) by income group, 2011

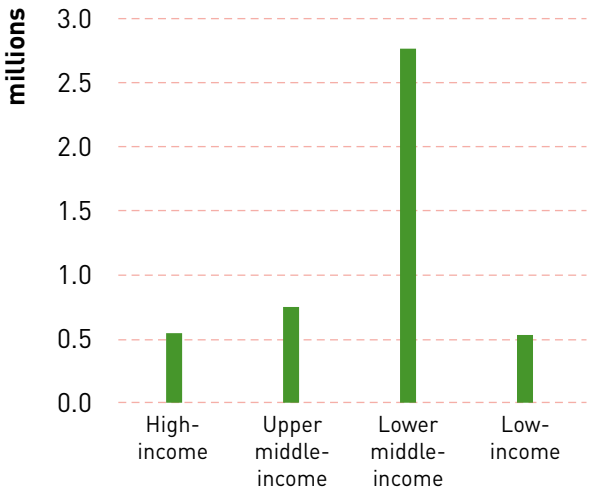
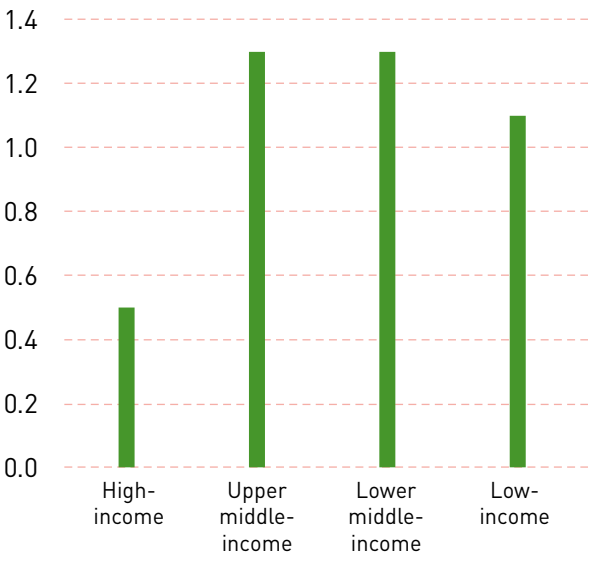


Figure 4.4. Comparative mortality rate due to diabetes per 1,000 (20-79) by income group, 2011



Map 4.1. Countries by World Bank income group classification

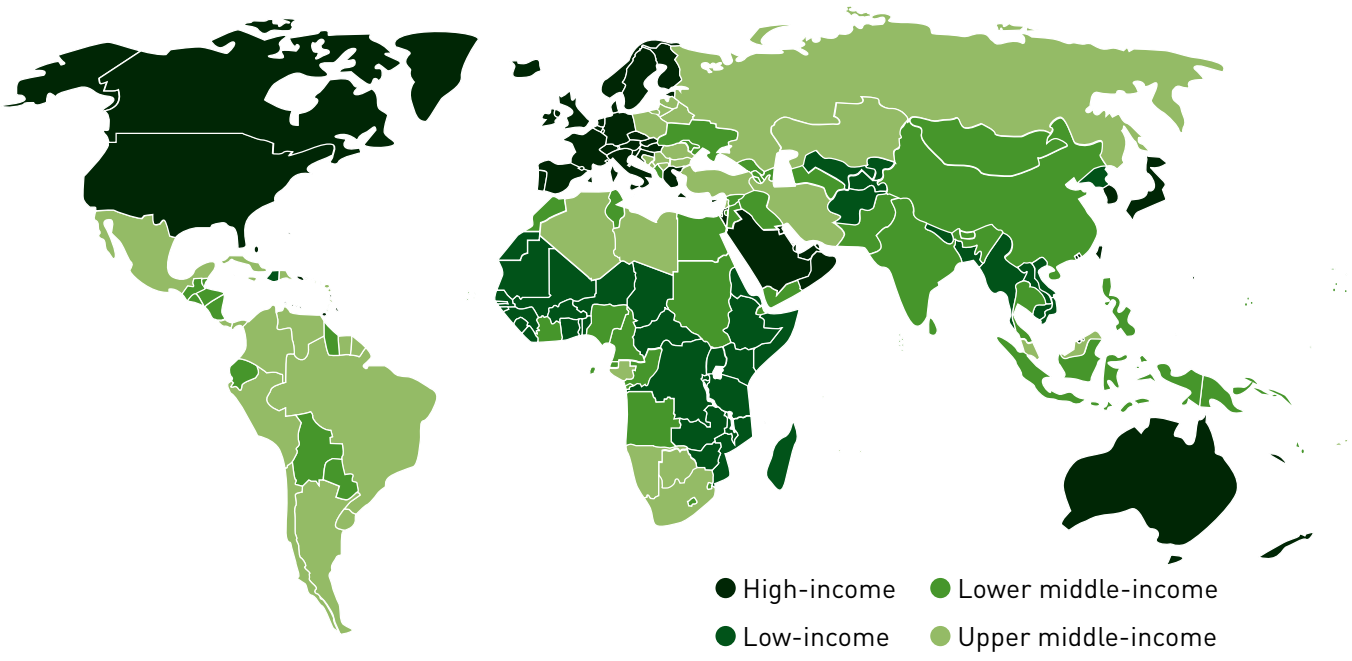
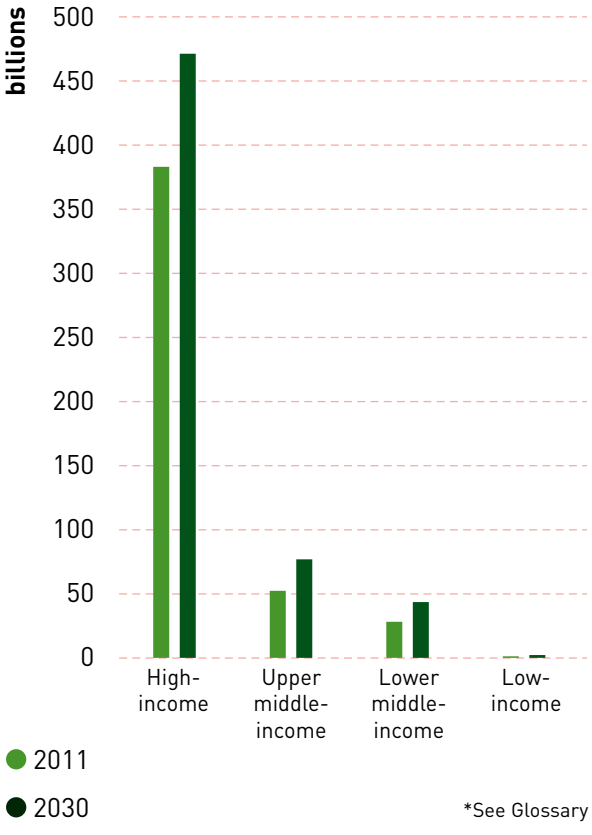


Figure 4.5. Total healthcare expenditures due to diabetes by income group in USD (billions), R=2*



*See Glossary

Table 4.1. Mean health expenditures due to diabetes per person with diabetes by income group, R=2*

INCOME GROUP	USD
2011	
High-income	**5,103.92**
Upper-middle income	**760.88**
Lower-middle income	**142.71**
Low-income	**45.09**
2030	
High-income	**5,006.76**
Upper-middle income	**767.22**
Lower-middle income	**140.85**
Low-income	**46.30**

*See Glossary

4.2. The social determinants of diabetes and the challenge of prevention

The UN Millennium Development Goals (set in 2000 and providing targets to be met by 2015) make no mention of diabetes or related non-communicable diseases (NCDs), reflecting the misconception that these are diseases of affluence (Section 4.4). In fact, diabetes and related NCDs should be key targets for reducing health inequity globally and within low- and middle-income countries as there are powerful underlying societal factors behind the diabetes epidemic.[1]

In high-income countries, type 2 diabetes tends to be more prevalent in the less well off. Diabetes is often more common in the wealthier parts of the population of low-income countries, but there is also evidence that in some middle-income countries, it is now more common in poorer sections of society.[2] However, focusing only on which socioeconomic group has the most diabetes obscures the fact that even in low-income countries, diabetes is already very common in the poorest sections of society – especially in urban areas, where one in six, or more, adults has diabetes.

Spending on care

In countries where access to healthcare is limited, and people often need to pay for their own care, it is the poor on whom diabetes has the greatest social and economic impact. For example, in Chennai, India, people from middle- or low-income groups can spend a sixth to a quarter of their income on diabetes care.[3]

The obesogenic environment

The underlying determinants of diabetes are the same the world over. Economic development is associated with increasingly 'obesogenic environments' characterised by decreased physical activity and increasing access to energy-rich diets. Globalisation plays a large part in these changes, for example, transnational food corporations are one of the major investors in low- and middle-income countries,[4] as the profits to be gained from food processing and retailing are huge.

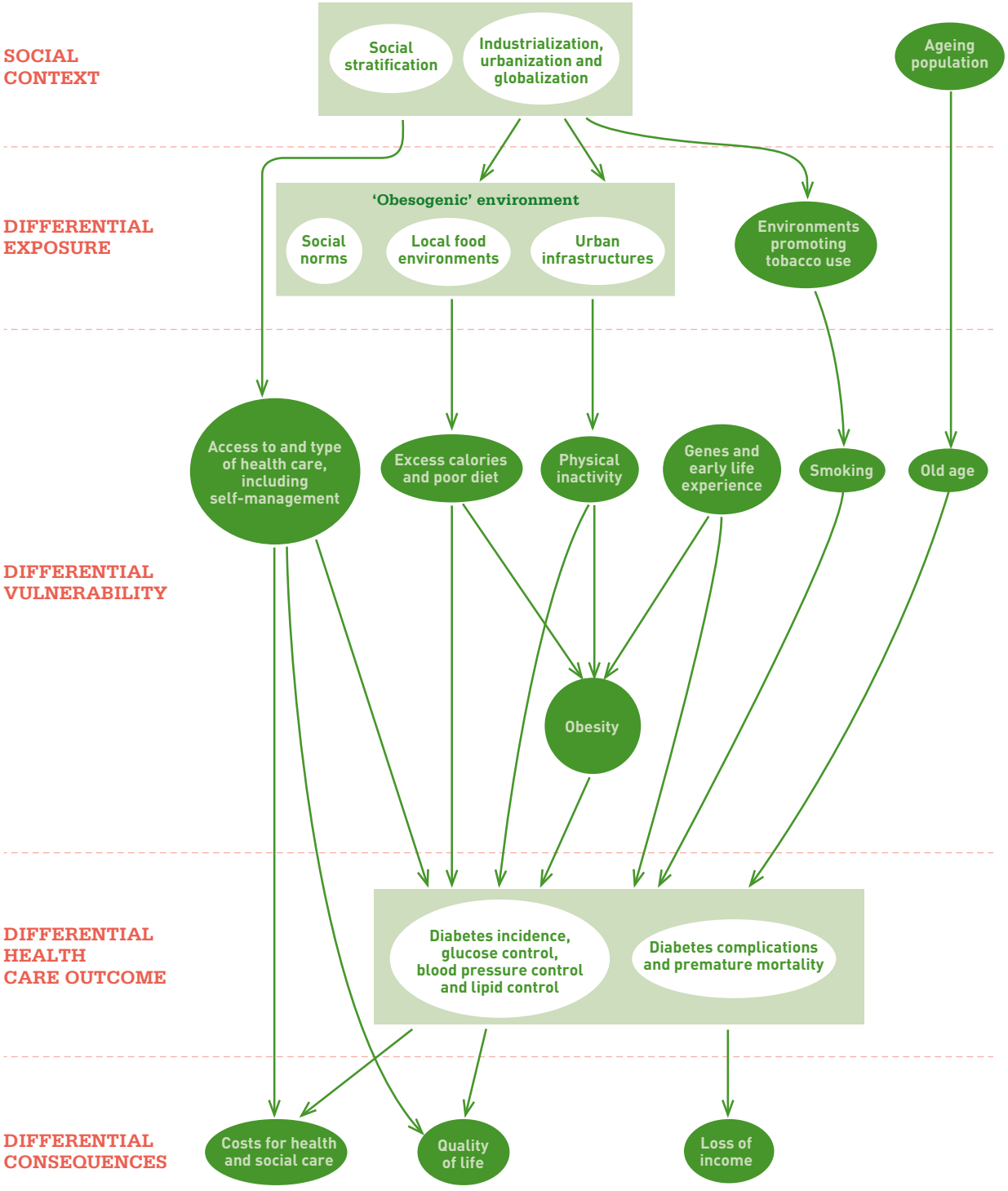
Figure 4.6 outlines key factors in the determinants and consequences of diabetes, according to the framework used by the World Health Organization book on equity, social determinants, and public health programmes.[1] This demonstrates the way that underlying societal factors are driving the diabetes epidemic in all countries. At each level there are social gradients resulting in worse outcomes and consequences for those who are disadvantaged. For example, the poor are more likely to be exposed to an 'obesogenic environment' and more likely to have worse health outcomes. In addition, poor women are more vulnerable to poor nutrition during pregnancy which can raise their child's vulnerability to the risk factors for diabetes later in life.

Challenges of prevention

There is a great deal of interest in approaches to the prevention of type 2 diabetes that target people who are at high risk.[5, 6] However, targeting individuals at high-risk is at best likely to have a moderate impact on the prevalence of type 2 diabetes. There are two reasons for this. Firstly, it is difficult to translate approaches from complex and well-resourced research studies into the 'real world', including being able to find and recruit people who are at high-risk and deliver effective prevention. Secondly, a substantial proportion of diabetes will arise in people who are not identified as high-risk, and who would not, therefore, be recruited for such preventive interventions.

The real challenge is to tackle the underlying determinants of type 2 diabetes globally, which, put simply, means modifying environments to make them less obesogenic. This challenge is as great if not greater than reducing tobacco consumption. Modifying the obesogenic environment is likely to require a broad range of policy measures across multiple sectors.

Figure 4.6. The social determinants and consequences of type 2 diabetes



Source: Equity, social determinants and public health programmes, World Health Organization, Geneva, 2010.

4.3. Diabetes and tuberculosis

People with diabetes are at higher risk of developing tuberculosis (TB) than those without diabetes. Tuberculosis, an infectious disease of the lungs, affects 9.4 million people and kills 1.7 million worldwide every year.[1]

TB is a major public health problem in many low- and middle-income countries, where the number of people with diabetes is also rising rapidly. Regions, such as Africa and Asia that are most heavily affected by tuberculosis are also those that have some of the highest numbers of people with diabetes (Map 4.2), and will experience the biggest increases by 2030 (Section 2.1).

Growing double burden

The growing prevalence of diabetes poses a challenge for TB control as uncontrolled diabetes leads to a greater risk of developing TB. A recent study showed that countries that saw an increase in diabetes prevalence also had a significant increase in the number of people with TB.[2] This suggests that increasing diabetes prevalence could make attainment of the Millennium Development Goals on tuberculosis more difficult to achieve (Section 4.4).

These trends reflect the important links between the diseases. Several studies have looked at the association between diabetes and tuberculosis in developed countries[3] and found that people with diabetes are around 2.5 times more likely to develop tuberculosis.[4] These findings were also true of developing regions including Africa where one study found that the prevalence (%) of diabetes was twice as high in people with tuberculosis than in people without tuberculosis.[2]

Map 4.3 shows estimates of the proportion of tuberculosis attributable to diabetes. In countries where the burden of diabetes is relatively high, for example Mexico, Egypt, Saudi Arabia, and the United States of America, it is a significant contributor to the number of cases of tuberculosis. However, where rates of tuberculosis are high and diabetes is relatively low, diabetes contributes to a smaller proportion of the TB burden.

Treatment and screening

Not only does diabetes contribute to a person's risk of developing tuberculosis, but it also makes it more difficult to treat those who have both diseases. A review looking at the impact of diabetes on tuberculosis treatment found that people with diabetes are more likely to fail treatment and more likely to die during treatment compared to those without diabetes.[5]

The link between tuberculosis and diabetes requires interventions that address both diseases. For example, screening for tuberculosis in people with diabetes and screening for diabetes in people with tuberculosis could offer opportunities to increase detection and prevent diabetes or tuberculosis-related complications.

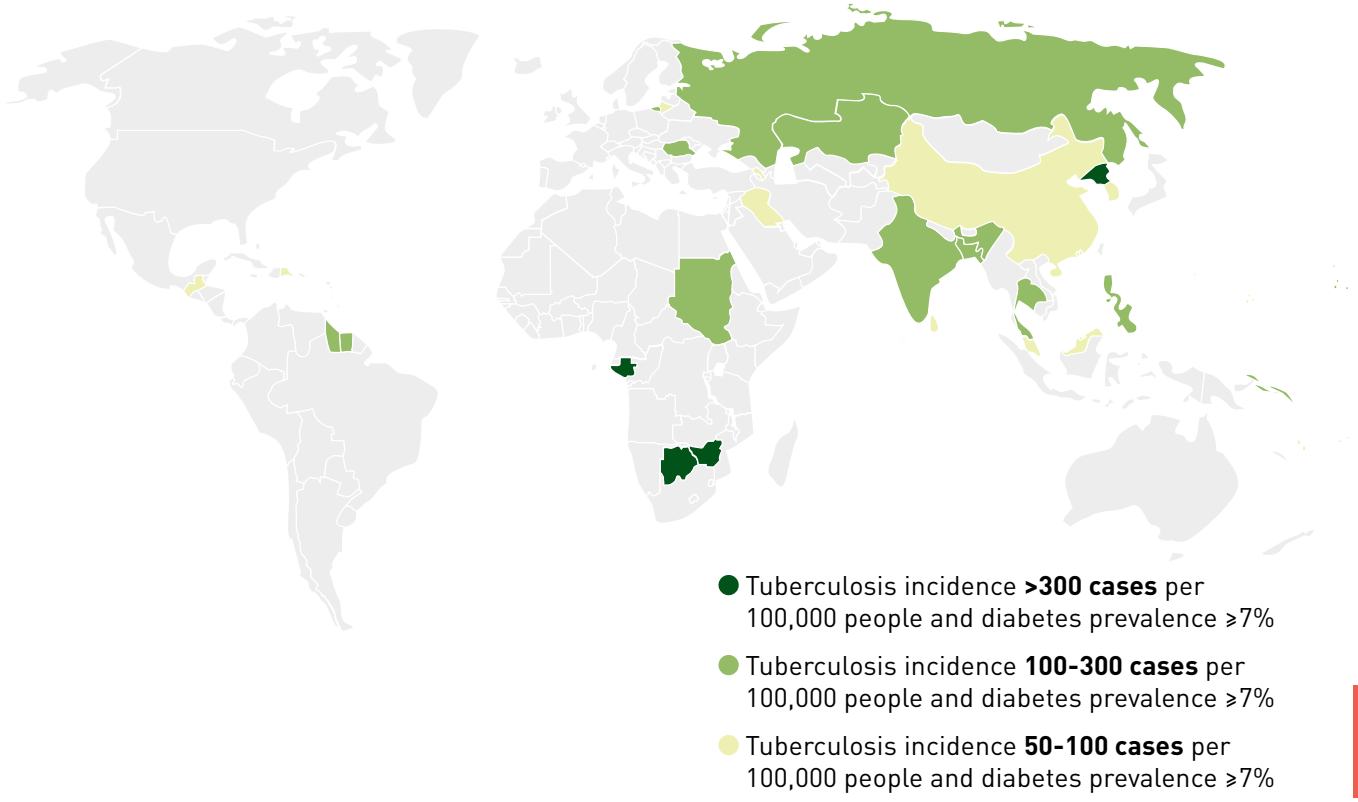
A recent review showed that when people with diabetes were checked for tuberculosis, more people were found to have previously undiagnosed TB than in the general population. This was also true of people who had tuberculosis, and were checked for diabetes, in which many more were found to have previously undiagnosed diabetes than in the general population.[6]

People with diabetes who have good glucose control are less likely to develop tuberculosis.[7, 8] In addition, tuberculosis treatment leads to decreasing blood glucose levels[6] suggesting that integrated management of tuberculosis in people with high blood glucose could lead to better diabetes control.

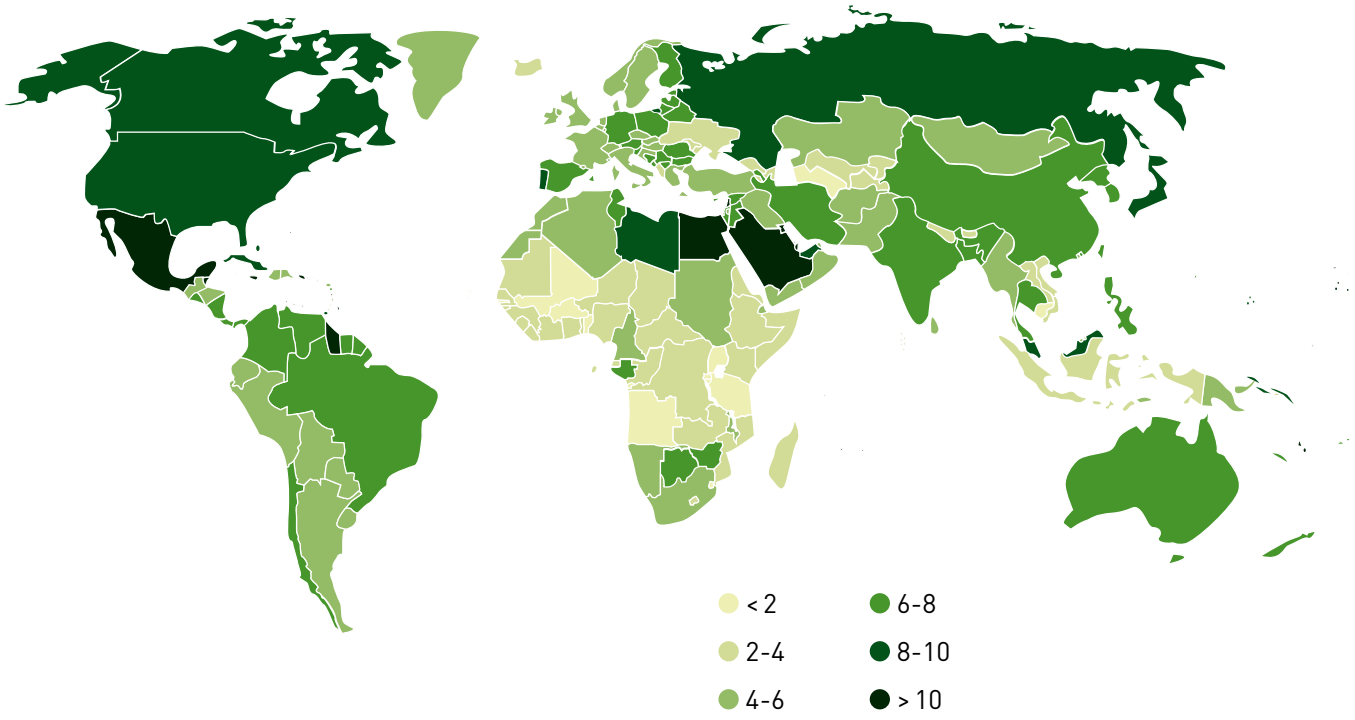
Disease management

Effective management of both diseases requires the same elements including early detection, providing guided standard treatment, and having an effective drug supply. The same principles can be applied to both diseases and help many people affected by tuberculosis and diabetes. Setting standards on these simple priorities could lead to effective detection and treatment for diabetes as has been seen in global tuberculosis control.

Map 4.2. **Countries with a high incidence of tuberculosis (TB) and a high prevalence of diabetes (20-79 years), 2011**



Map 4.3. **Percentage of tuberculosis cases attributable to diabetes (20-79 years), 2011**



4.4. Diabetes and the Millennium Development Goals

Diabetes has strong links with poverty, poor nutrition, infectious disease, and many aspects of social and human development. These affect targets included in the Millennium Development Goals (MDGs) set and adopted by the global health community with a deadline for meeting specific goals by 2015. Many countries are still behind in their progress towards achieving the MDGs.

Diabetes affects individuals with lower socioeconomic status, as well as disproportionately affecting low- and middle-income countries (Sections 4.1, 4.2, and 4.3), where the prevalence of diabetes and other non-communicable diseases (NCDs) are increasing and the burden of infectious diseases remains high. This 'double burden' of infectious and NCDs is undermining efforts to reduce poverty and achieve the MDGs in many countries (Table 4.2).[1]

Diabetes is a poverty issue (MDG1)

The economic impact of diabetes can be huge, through spending a large proportion of income on care, loss of income or work, or reduced productivity. For example, in India up to 25% of annual household income is spent on diabetes care.[2] The economic burden of diabetes and disability from complications can push poor families into destitution and poverty. At a national level the diabetes epidemic threatens to overwhelm health systems, and potentially reverse development gains made in low-income countries.[3] As a result, efforts to eradicate extreme poverty will be impeded.

Gender inequality and diabetes (MDG3)

Low socioeconomic, legal, and political status of girls and women can increase exposure and vulnerability to the risk factors of diabetes (Section 4.3), particularly in low- and middle-income countries. In countries with pronounced gender inequality, the low social status of girls and women can result in poor nutrition, and social norms can restrict physical activity.

If women have reduced access to essential healthcare for diabetes because of gender biases in power, resources, culture, and the organisation of services this can result in increased risk of complications and death (Chapter 2). Women and girls are also more likely to take on the burden of care for a family member diagnosed with diabetes,[4] thereby contributing to health inequalities between men and women, and weakening efforts to promote gender equality and empower women.

Diabetes and maternal and child health (MDGs 4 and 5)

Diabetes is an important maternal health issue. Uncontrolled diabetes during pregnancy threatens the health of both mother and child, and is associated with the delivery of macrosomic or large-for-gestational-age infants (Chapter 1). This can result in life-threatening and costly complications for the mother, such as obstructed labour, and complications that threaten the life and health of the newborn child.

Gestational diabetes (GDM) is also associated with several pregnancy complications and increased future risk of type 2 diabetes for mother and child.

Diabetes and infectious diseases (MDG6)

Despite a scope that included all major diseases, targets for MDG6 were focused on HIV/AIDS, tuberculosis (TB), and malaria (Table 4.2). A person with HIV/AIDS is vulnerable to diabetes, as the use of some drugs to treat HIV/AIDS can greatly increase the risk of diabetes.[5] People with diabetes are also at least 2.5 times more likely to develop TB (Section 4.2). In India, 15% of TB cases can be attributed to diabetes (Section 4.3).

There is some evidence that a person with diabetes has a higher chance of contracting malaria[6] and may have worse outcomes if they develop cerebral malaria.[7] These links show that unless diabetes is included in efforts to combat HIV/AIDS, malaria and TB the targets laid out by MDG6 will be harder to achieve.

Beyond targeting the increased risk of poor outcomes from these linked diseases, improvements in health systems, integrating care, and building capacity will provide the foundation for gains in all of these major causes of the disease burden.

Box 4.1.

Diabetes is a global health disaster which is critically connected to a wide range of other health and development issues. Diabetes undermines economic sustainability and human development, and is closely linked with infectious diseases. The underlying societal factors drive increasing rates of diabetes and other non-communicable diseases, but they also share common solutions. Diabetes is therefore integral to many of the challenges of our time.

Figure 4.7. The critical connections with diabetes

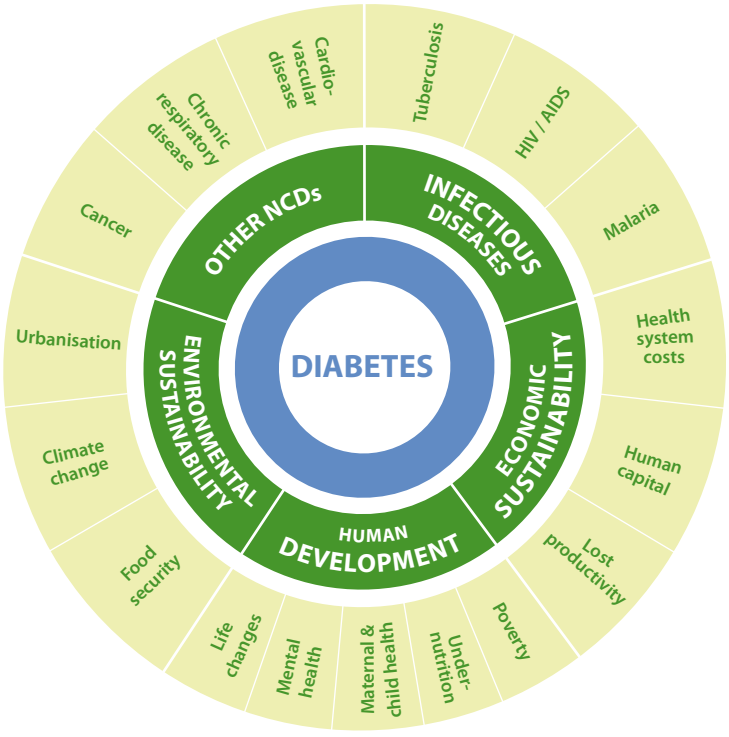


Table 4.2. Millennium Development Goals with links to diabetes

MILLENNIUM DEVELOPMENT GOALS	TARGETS	
MDG1: Eradicate extreme poverty and hunger	• **Target 1A**	halve, between 1990 and 2015, the proportion of people whose income is less than one dollar a day
	• **Target 1B**	achieve employment for women, men and young people
	• **Target 1C**	halve, between 1990 and 2015, the proportion of people who suffer from hunger
MDG3: Promote gender equality and empower women	• **Target 3**	eliminate gender disparity in primary and secondary education, preferably by 2005, in all levels of education no later than 2015
MDG4: Reduce child mortality	• **Target 4**	reduce by two-thirds, between 1990 and 2015, the under-five mortality rate
MDG5: Improve maternal health	• **Target 5A**	reduce by three-quarters, between 1990 and 2015, the maternal mortality rate
	• **Target 5B**	achieve universal access to reproductive health by 2015
MDG6: Combat HIV/AIDS, malaria and other diseases	• **Target 6A**	have halted by 2015 and begun to reverse the spread of HIV/AIDS
	• **Target 6B**	achieve, by 2010, universal access to treatment for HIV/AIDS
	• **Target 6C**	have halted by 2015 and begun to reverse the incidence of malaria and other diseases

Linking local to global

5

> IDF links the **local to the global**: from grass roots activism by people with diabetes, through programmes with health professionals, to influencing global health and development policy

> IDF elevated diabetes onto the **global agenda** through the UN High-level Meeting on NCDs

> IDF supports a **global network** of health professionals from over 170 countries working in diabetes education

> The IDF World Diabetes Congress is the **only global event** that brings together the whole **diabetes community**

> IDF leads the World Diabetes Day campaign: over **1,000 buildings** around the world illuminated in blue on **14 November**

5 Linking local to global

5.1. The UN High-level Meeting and beyond

The UN High-level Meeting on Non-Communicable Diseases held on 19-20 September 2011 in New York was a major milestone in the history of the global diabetes and non-communicable diseases (NCDs) epidemic. Building on the achievement of UN Resolution 61/225 on diabetes in 2006, and drawing from the lessons and successes of the HIV/AIDS UN General Assembly Special Session a decade ago, IDF saw the UN High-level Meeting on NCDs as an opportunity to engage heads of state and governments to secure a comprehensive set of commitments at the highest political level and accelerate global progress on diabetes and the other non-communicable diseases.

The impact of the process

Since the unanimous decision to hold the UN High-level Meeting on NCDs, IDF and its sister federations in the NCD Alliance worked to lay the foundations for a successful summit and maximise this once-in-a-generation opportunity. The official process and preparations for the summit have changed the global health landscape forever. It has catalysed high level discussions on diabetes and NCDs at national, regional, and global levels that were not happening before – amongst non-governmental organisations (NGOs), governments, international organisations, and the private sector.

As part of preparations for the summit, IDF consulted national member associations and experts in diabetes to align priorities and bring a united voice for diabetes to the discussions. The top priorities identified by more than 115 member associations in 160 countries who responded to this consultation are presented in Box 5.1. Informed by these consultations, IDF and the NCD Alliance published a Proposed Outcomes Document setting priorities for negotiations.

Official negotiations

The official summit process included World Health Organization (WHO) Regional Consultations on NCDs, many resulting in official declarations which highlighted the similarities and differences in priorities of governments and political blocs. WHO also held a number of multi-sectoral consultations, co-hosted the First Global Ministerial Conference on NCDs, and worked with the UN to convene a Civil Society Hearing at UN Headquarters which provided further opportunities for government decision-makers to familiarise themselves with NCDs evidence and issues, and hear the priorities of civil society, including those put forth by the NCD Alliance. As part of the process, WHO, the UN Secretary General, and the World Economic Forum all published reports strengthening the evidence for NCDs and highlighting the cost of inaction.

Building and strengthening alliances

Another significant marker of summit preparations was the strengthening of alliances and partnerships to tackle the global NCDs epidemic. IDF and the NCD Alliance created a NCD civil society movement in an unprecedented time, working together across diseases for a common cause. This civil society movement is here to stay and will be integral to continuing momentum and monitoring commitments post-summit. Influential relationships were built with Governments, the private sector, and NGOs working in inter-related development issues such as maternal and newborn child health (MNCH), HIV/AIDS and TB. IDF and NCD Alliance partners produced two influential articles on NCDs priorities and solutions with the Lancet NCD Group. These alliances have promoted exchange of best practice and innovative solutions in diabetes and NCDs prevention and control.

Drafting the Political Declaration

These preparations all lead to the drafting of the Political Declaration, presented at the UN High-level Meeting, which will have a global impact on the lives of people with diabetes.

The future of diabetes after the UN High-level Meeting on NCDs

These preparations fed into the drafting of a Political Declaration for agreement at the High-level meeting. Negotiations were drawn-out due to a lack of consensus on many important issues. However, the 193 UN Member States finally agreed on a strong document with a comprehensive set of political commitments. This ground-breaking Declaration marks world leaders' recognition of the magnitude and impact of NCDs and positions them as a development issue that reaches beyond the health sector. A record 34 Heads of Government and State attended and 120 Member States made statements. The High-level meeting has undoubtedly inspired political will and leadership for diabetes and NCDs and the resulting Political Declaration provides a framework for saving millions of people from preventable death and disability.

Box 5.1. Top priorities by IDF Region (percentage of respondents strongly agreeing)

- **Africa:** "Access to low cost medicines and supplies" (86%)
- **Europe:** "Programmes for detection and management of complications of diabetes" (72%)
- **Middle East and North Africa:** "Improve the training, education, and support for healthcare professionals" and "extend health services to all areas of the country" (100%)
- **North America and Caribbean:** "Promoting a healthy diet through education" and "access to healthy food for disadvantaged population groups" (100%)
- **South and Central America:** "Access to low cost medicine and supplies" and "self-care education" (100%)
- **South-East Asia:** "Labelling food products" (100%)
- **Western Pacific:** "Self-care education" (93%).

Areas of success

LEADERSHIP AND INTERNATIONAL COOPERATION

Diabetes and NCDs are now seen as a development issue. The Declaration encourages their inclusion in development agendas and urges international organisations to provide technical assistance and capacity building for NCDs to developing countries. National leadership is a strong component with a specific commitment for governments to establish or strengthen multi-sectoral national policies or plans by 2013.

ESSENTIAL MEDICINES AND TECHNOLOGIES

Importantly for people with diabetes, the Declaration commits governments to increasing access to affordable, safe, effective, and quality-

assured medicines and diagnostic technologies. It includes specific language on the use of generics and patent licensing flexibilities to improve access, availability and affordability.

HEALTH SYSTEMS

The Declaration recognises the importance of a well-functioning health system to deliver care to people with NCDs and of universal coverage in national health systems, particularly through primary healthcare and social protection mechanisms. The Declaration also includes commitments to promote training and retention of health workers.

PREVENTION

Focus is put on health-promoting environments with action on promoting healthy diets and increasing physical activity through urban planning, active transport, and work-site healthy lifestyle programmes. Governments have committed to reducing salt, sugar, and saturated fats, and eliminating industrially produced trans-fats in foods although without agreed targets. The Declaration recognises the links between maternal under-nutrition during pregnancy and gestational diabetes and increased risk of the infant developing diabetes later in life. The Declaration promotes the inclusion of NCDs in reproductive, maternal and new-born child health programmes.

FOLLOW-UP

The UN Secretary General is required to report on progress in 2013 at the General Assembly and Member States will hold a comprehensive review and assessment in 2014. This review will enable the tracking of commitments made in the present Declaration and of progress on future global targets and indicators that Member States should deliver on. It is also an opportunity to ensure that diabetes and NCDs are integrated with other health priorities in future internationally agreed development goals when the current Millennium Development Goals (MDGs) end in 2015.

Areas for further action

TARGETS

The Declaration lacks overarching goals and time-bound targets. As the 2001 HIV/AIDS Political Declaration demonstrated bold goals and targets inspire leadership, ensure broad action and create a political action plan for stakeholders to measure progress. Member States have missed this opportunity, postponing the decision until 2012 when they will agree a comprehensive global monitoring framework for NCDs and voluntary global targets and indicators.

RESOURCING

While the Declaration recognises that resources for diabetes and NCDs are not commensurate with the magnitude of the problem, it falls short of concrete commitments, only requesting Member States to investigate options for potential sources of funding. Encouragingly, it does specify bilateral and multilateral channels, which to date have been limited for diabetes and NCDs, as well as innovative long-term financing approaches.

PARTNERSHIP

Governments recognised the importance of multi-sectoral action, but failed to commit to a high-level NCD partnership to coordinate and drive follow-up action. Instead they requested the UN Secretary-General to present recommendations in 2012 outlining options for such a partnership. NGOs must be involved in this process.

Next steps

The UN High-Level Meeting on NCDs is a watershed event, but it is just the beginning of a new era for diabetes. The Political Declaration opens the door for advocacy efforts in 2012 on the development of global targets, a monitoring framework and a high-level NCD partnership. With the MDGs Review in 2013, the global diabetes community must campaign to ensure diabetes and NCDs are integrated into future internationally agreed development goals. Governments are now looking to civil society for guidance and technical expertise on implementing elements of the Declaration. IDF is ready to lend expertise to governments to deliver the necessary actions, as well as play a 'watch dog' role holding governments accountable for the promises made. IDF is proud to have led the movement to this achievement but the campaign goes on for the millions of people with diabetes worldwide.

Table 5.1. Summary analysis of UN High-level Meeting commitments and implications for the global diabetes community

ISSUE	COMMITMENTS
NATIONAL POLICIES AND PLANS	• By **2013**, establish and strengthen **multisectoral national NCD policies and plans** • **Integrate NCD policies and programmes** into national health planning and development agendas
ESSENTIAL MEDICINES AND TECHNOLOGIES	• **Increase access** to affordable, safe, effective and quality medicines, diagnostics and technologies, including through the use of generics and patent licensing flexibilities • Encourage the development of new medicines, vaccines, diagnostics and technologies, **learning from the experiences in HIV/AIDS**
PREVENTION	• Advance implementation and strengthening of **cost-effective, population wide interventions** to reduce NCD risk factors • Promote **healthy diets and increase physical activity** through implementation of WHO recommendations on **marketing of foods and non-alcoholic beverages** to children; the elimination of **trans-fats**; reduction of **salt, sugars and saturated fats;** and encourage policies that support production of **healthy foods** • Promote the **inclusion of NCD prevention and control** within sexual and reproductive health and maternal and child health programmes, including **breastfeeding for the first 6 months**
HEALTH SYSTEM STRENGTHENING	• Strengthen health systems to **support universal coverage**, **primary healthcare** and cost-effective **integrated services** for prevention, detection, treatment and care of NCDs • Promote training and retention of **health workers** • Strengthen **information systems** for health planning and management • Strengthen procurement, storage and distribution of medicines
RESOURCING	• Identify and mobilise adequate, predictable and sustained **financial resources** via domestic, bilateral, regional and multilateral channels, and innovative financing mechanisms • Provide **technical assistance and capacity building** to developing countries for NCDs, and enhance the quality of aid and **fulfil Official Development Assistance (ODA)-related commitments** • According to national priorities, increase and **prioritise budgetary allocations** for NCDs, and establish **taxation measures** where appropriate
PARTNERSHIPS	• In **2012**, UN Secretary-General to present recommendations for a **multisectoral NCD partnership** • Foster **partnerships between government and civil society**
INTERNATIONAL COOPERATION	• Call upon WHO, relevant UN agencies, funds and programmes, international institutions and development banks to **work together in a coordinated manner** to support national NCD efforts • Stress the importance of North-South, South-South and traingular cooperation in NCDs
RESEARCH AND DEVELOPMENT	• Strengthen **national capacity** for quality research and development on NCDs and its **translation into programmes** on the ground
MONITORING AND EVALUATION	• By **2012**, develop a comprehensive **global monitoring framework** for NCDs and a set of voluntary global targets and indicators • Consider national **targets and indicators** and strengthen country-level **surveillance and monitoring** systems
FOLLOW UP	• In **2013**, UN Secretary-General to present a **report on progress** on NCDs, including on the impact on internationally agreed development goals • In **2014**, hold a **comprehensive review and assessment** on progress achieved on NCDs

5.2. Promoting best practice in diabetes education

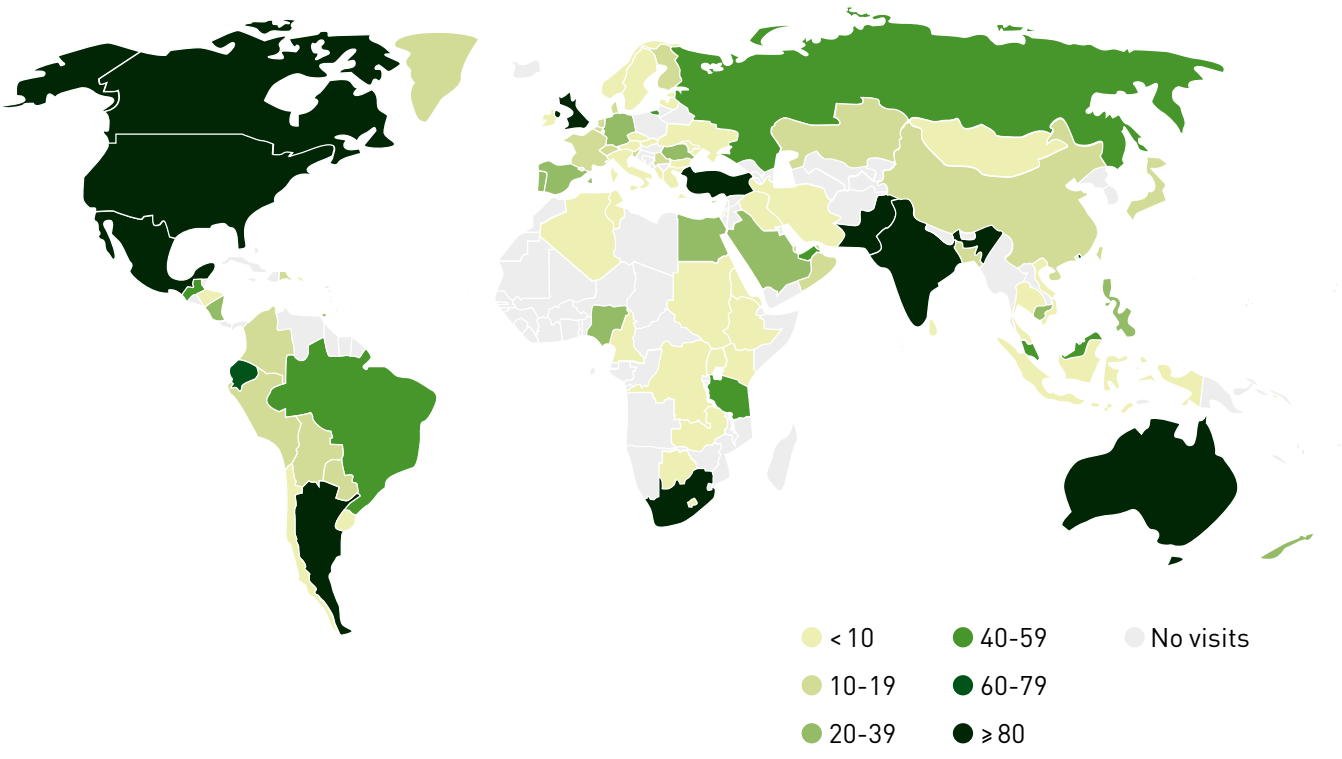
Diabetes requires high-quality clinical care delivered by appropriately trained personnel and effective self-management. It is vital for people with diabetes and those at risk of diabetes to have diabetes self-management education and on-going support. However, there is currently a worldwide shortage of health workers and therefore one of IDF's priorities is to support specialist training and best practice in diabetes education. The IDF Consultative Section on Diabetes Education (DECS) produces education materials, conducts training courses, and organises workshops for health professionals.

In 2010 DECS launched the Diabetes Education Network for Health Professionals (D-NET), the first international on-line forum to enhance diabetes education and management. It is a place for health professionals to connect, find support, share best practices, and discover learning opportunities.

Participants in D-NET can read and discuss recent postings on issues in diabetes education and management, engage with international experts in scheduled guided discussions, post articles or resources, and start discussions of their own. They share experiences with professionals from all over the globe and gain valuable comparative knowledge on the challenges and successes in working in diabetes education.

D-NET forums are currently available in English and Spanish with plans to expand to more languages. Since its launch, D-NET has attracted over 1,200 members and is still growing. Activity in D-NET continues to grow as new members sign up and new discussions from around the globe are started.

Map 5.1. Visits to D-NET, 2011



5.3. Diabetes Conversations

IDF's diabetes education initiatives aim to both develop a high-quality global workforce for diabetes education and care, as well as provide a broad base of knowledge and skills to people with diabetes that allow them to facilitate and enhance their own care. Diabetes education prepares people with diabetes to make informed decisions, cope with the demands of living daily with a complex chronic disease and make necessary behaviour changes.

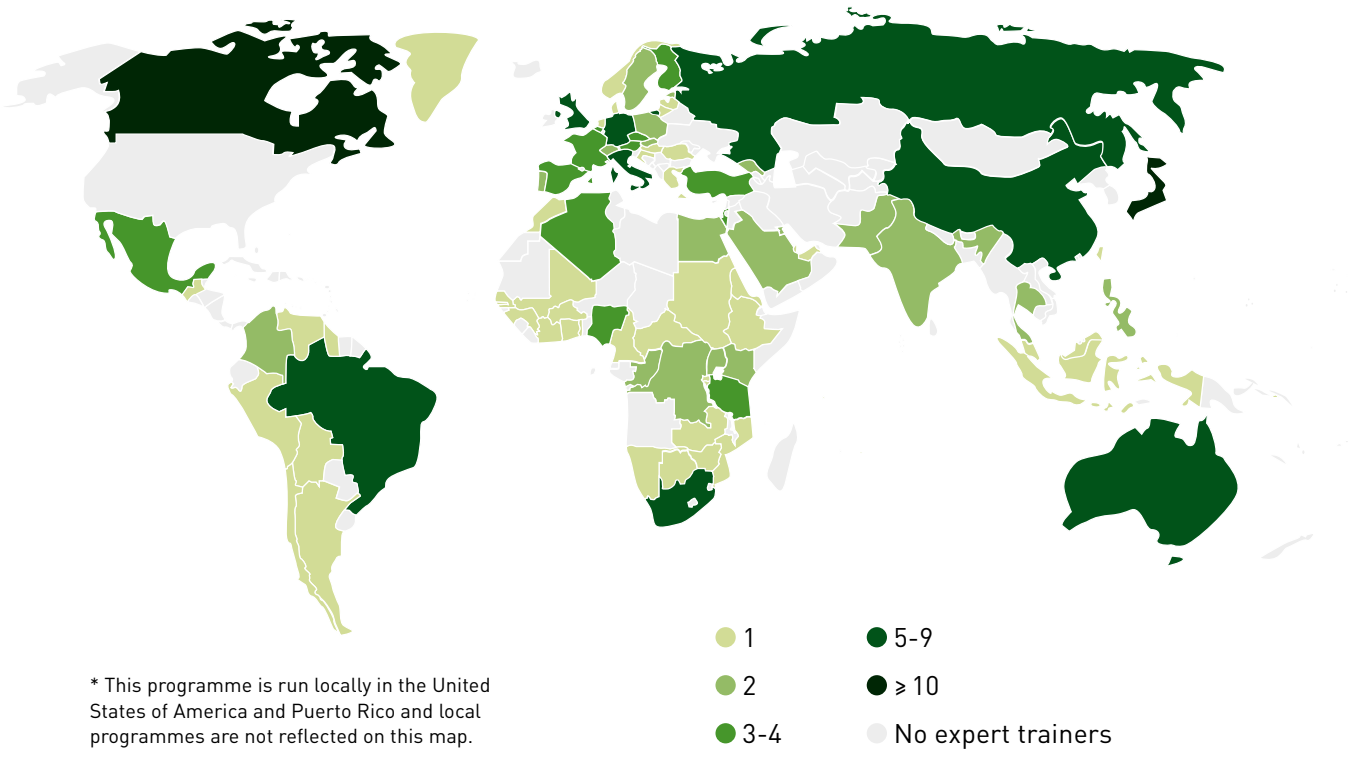
Diabetes Conversations is a global programme that improves access to group self-management education for people with diabetes. It has achieved great success to date; in 2011, the programme was implemented in over 110 countries and territories and in 35 different languages.

The programme features *Conversation Map*™ education tools. Health professionals use these tools to engage people with diabetes in an open and interactive group discussion to support them in their self-management efforts. They have been translated and adapted for each country with input from local experts in diabetes education.

The *Conversation Map*™ tools are implemented through a train-the-trainer model. In 2011, the programme included 200 health professionals selected from various countries as Expert Trainers. Expert Trainers develop their knowledge and skills through training sessions and networking opportunities. They go on to train other health professionals in their countries to facilitate group education sessions for people with diabetes. These health professionals then implement the *Conversation Map*™ tools themselves and gain experience in practical group education.

The *Conversation Map*™ tools are used in a variety of settings – ranging from hospitals to community health centres to national diabetes associations.

Map 5.2. Expert Trainers in the Diabetes Conversations programme, 2011*



* This programme is run locally in the United States of America and Puerto Rico and local programmes are not reflected on this map.

5.4. World Diabetes Congress

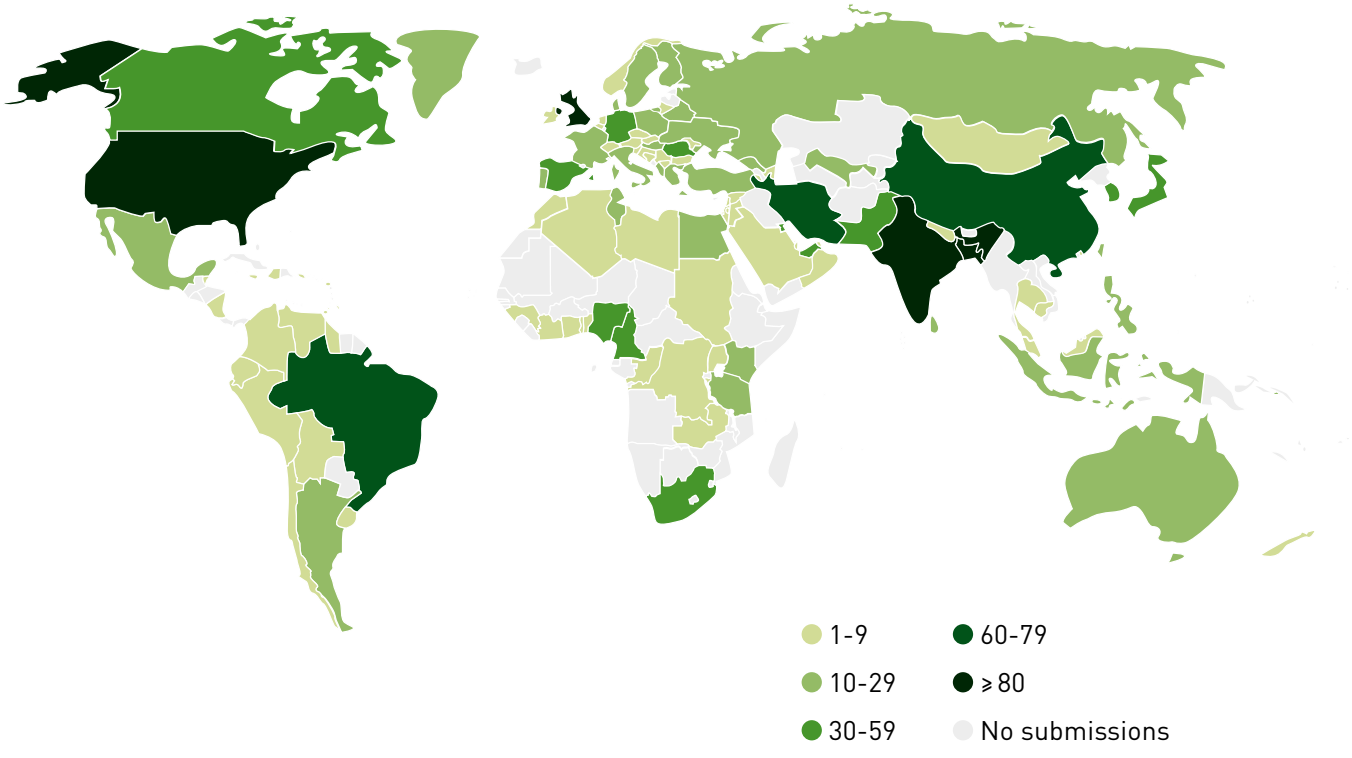
The IDF World Diabetes Congress is the only global event that brings together the whole diabetes community. The Congress attracts over 12,000 scientists, health professionals, health ministers, policy-makers, industry, media, and people with diabetes and provides a global platform to share knowledge, the results of the latest in diabetes research, and common experiences.

In 2011, the Congress in Dubai shines a spotlight on the emergence of the Middle East and North Africa Region as one of the regions with the highest burden of diabetes. The United Arab Emirates, where Dubai is located, is one of the top ten countries with the highest prevalence (%) of diabetes. The World Diabetes Congress aims to encourage governments and local stakeholders to act. This Congress includes a new stream on Global Challenges in Health to focus on health policy and promoting solutions for diabetes.

The World Diabetes Congress in Dubai has already drawn an enthusiastic response from the global scientific community. Abstracts submitted to the Congress represent every part of the globe, with the largest submissions coming from India, one of the top ten countries with the most number of people with diabetes. The Africa Region, the Middle East and North Africa Region, and the South-East Asia Region have almost doubled the number of abstracts submitted from the previous congress, reflecting a substantial growth in the amount of research being conducted. At the close of the abstract submission period the World Diabetes Congress 2011 in Dubai had received 1,920 abstracts submitted by 1,442 authors.

Beyond scientific research, the World Diabetes Congress also strengthens the global diabetes community and links the work of member associations, people with diabetes, and health professionals to global advocacy to improve the lives of people with diabetes.

Map 5.3. Abstract submissions to the 2011 World Diabetes Congress



5.5. World Diabetes Day

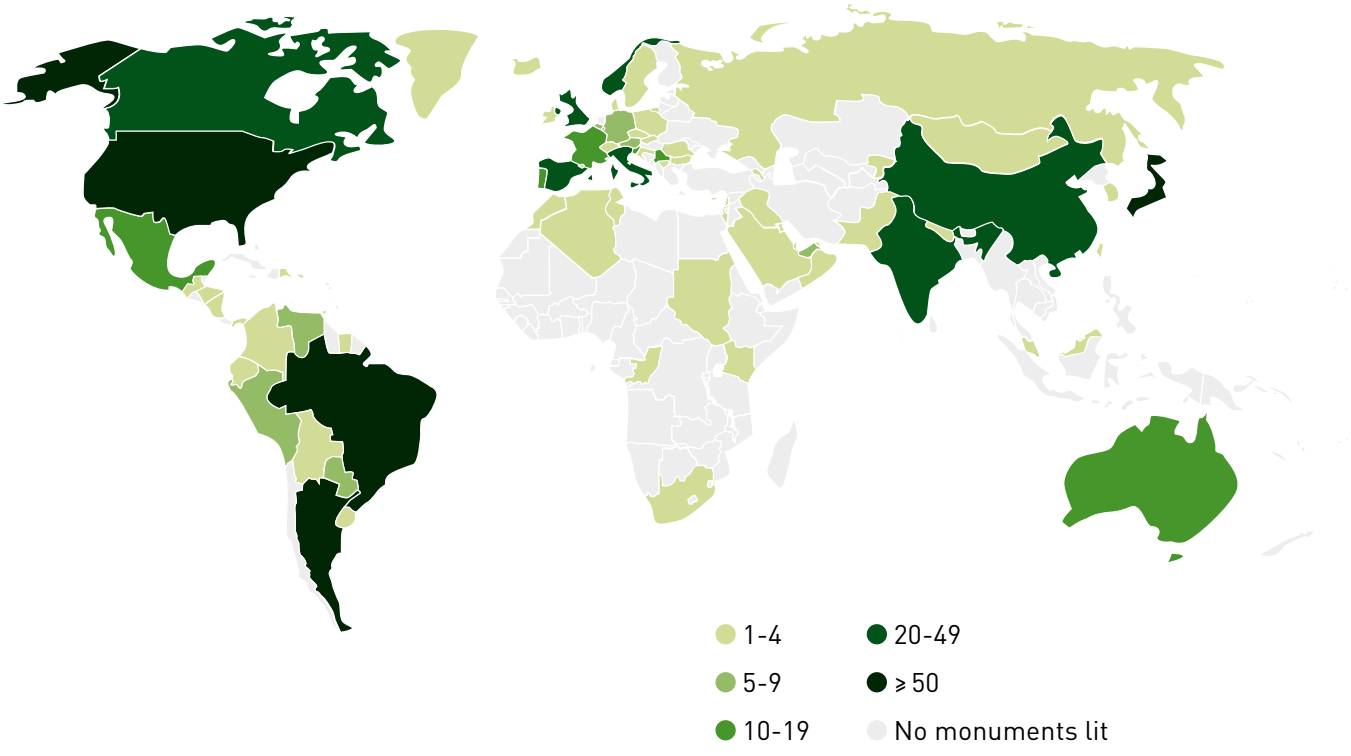
Held each year on November 14th, World Diabetes Day is the primary global awareness campaign of the diabetes community. By uniting national member associations in more than 160 countries around the World Diabetes Day campaign, IDF provides a powerful, global voice for diabetes that vastly increases the visibility, reach, and impact of individual member associations.

One of the most dramatic displays of global support was the more than 900 monuments and buildings in 84 countries that were lit in blue to commemorate World Diabetes Day 2010. Iconic buildings and sites throughout the world were illuminated in the colour of the blue circle, the global symbol for diabetes and central component of the World Diabetes Day campaign logo. The blue lightings symbolise beacons of hope for the millions of people worldwide living with diabetes and the many more at risk, and provide a strong visual element to attract attention to the diabetes cause. They are also testimony to the power of the combined efforts of the global diabetes community to alter the diabetes landscape.

Launched in 2007, the 'Bring Diabetes to Light' campaign is a very popular activity among IDF member associations and other key stakeholders of World Diabetes Day. It is one of the core components of the global campaign celebrations.

Starting with the Empire State Building in New York City, over 1,000 monuments, buildings and landmarks in more than 115 countries have been lit in blue for diabetes since the launch of the campaign. These include world-renowned landmarks such as Christ the Redeemer in Rio de Janeiro, the Sydney Opera House, the Colosseum in Rome, the London Eye, Table Mountain in Cape Town, and Niagara Falls in the state of New York. The map shows how many monuments in each country were lit in blue for World Diabetes Day 2010.

Map 5.4. Monuments lit for the 'Bring Diabetes to Light' campaign on World Diabetes Day, 2010



Resources and solutions

6

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

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

> IDF is the **legitimate voice** of people with diabetes

6 Resources and solutions

6.1. Global solutions to a global problem

Diabetes is at crisis levels, but it is finally getting its place on the global health agenda. As the 2011 UN High-level Meeting on Non-Communicable Diseases in New York demonstrated, political leaders are seeking solutions.

IDF brought together world diabetes experts and consulted widely to provide those solutions. The result of those deliberations, the first ever Global Diabetes Plan, presents the evidence and proposes cost-effective solutions in a coherent framework for action.

Objectives

The Plan sets out a way forward based on three objectives:

1. **Improving the health outcomes of people with diabetes.** This objective focuses on: providing essential medicines, technologies, and services for people with diabetes; identifying, treating, and monitoring people at high-risk of complications, including those who are undiagnosed; and providing self-management education.
2. **Preventing the development of type 2 diabetes.** This objective embraces: a 'health in all policies' approach that tracks the impact of all proposals and supports the adoption of those that favour good health; healthy nutrition available for all, including reducing fats, sugar and salt in processed food and beverages and eliminating trans-fats; and everyday physical activity.
3. **Stopping discrimination against people with diabetes**. This objective: proposes the establishment of supportive legal and policy frameworks, particularly in the sectors of employment, education and insurance; involves people with diabetes in decisions about diabetes policy; and provides regular and transparent reporting on diabetes-related healthcare delivery and outcomes; and supports awareness-raising campaigns including identifying champions of change.

Key strategies

Within the Plan the key strategy for governments is the implementation of a National Diabetes Programme. This programme must improve the organisation, quality, and reach of diabetes prevention and care. Such programmes must be documented and transparent, have stated goals and objectives with specified timeframes and milestones, dedicated funding, and a means of evaluation.

The Global Diabetes Plan also provides advice to governments and international organisations on approaches that will deliver results. In particular, the Plan identifies the importance of strengthening institutional frameworks through several key strategies. These strategies include providing leadership at country and global levels, co-ordinating responsibility for diabetes and related non-communicable diseases at the highest level of government, and ensuring official action goes beyond health to other sectors such as agriculture, transport, environment and planning.

To ensure objectives set out above are achieved, the Plan also proposes that:

- The UN and its agencies work intensively with national governments to re-orient health systems from the traditional focus on acute care to a more pro-active and preventative continuing care model, including training and equipping health professionals to manage diabetes more effectively.
- Countries develop a prioritised national research agenda that fills knowledge gaps which currently hamper the prevention and control of diabetes, improves diabetes medicines and technologies for easier delivery especially in remote, resource-poor communities, and supports the search for a cure.
- Governments ensure that robust monitoring and data collection is performed and communicated and underpins continuing improvements to care delivery.
- Procurement and supply systems are reviewed and streamlined to ensure the effective distribution of essential diabetes medicines and technologies.
- Innovative, sustained and predictable financing is secured to implement the Plan and accelerate progress towards international development goals.
- Governments, the private sector, and civil society – including healthcare workers and academia – work together to foster innovation such as improving building design for greater physical activity, spark new thinking, and build new financing streams.

6.2. 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 from each of the IDF Regions.

The full texts of these documents are available at www.idf.org.

Clinical Guidelines

CLINICAL PRACTICE GUIDELINES

The Guide for Guidelines has been written for all those involved in the care of 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.

MANAGEMENT OF POST-MEAL 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 address 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, as well as women already known to have diabetes, to achieve the desired outcome of a healthy mother and baby.

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 the 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

Global Guideline for Type 2 Diabetes takes into account 19 specific healthcare domains and includes topics of importance and controversy. It takes a stepped approach focusing on three levels of care: standard care, minimal care, and comprehensive care. These can be scaled and adapted to fit the needs of different resources in different settings.

Position and Consensus Statements

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 patients should not be changed 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 eligible patients, to help stem the serious complications that can result from diabetes.

DIABETES AND CARDIOVASCULAR DISEASE (CVD)

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

Kidney disease caused by diabetes 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 blood glucose and blood pressure control.

DIABETES AND OBESITY

Obesity and diabetes currently threaten the health, well-being 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 used by the tobacco industry.

DIABETES SELF-MANAGEMENT EDUCATION

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

INTEGRATED PREVENTION OF NCDS

Statement made jointly by the International Obesity Task Force (IOTF) on behalf of the International Association for the Study of Obesity (IASO), the International Diabetes Federation (IDF), the World Heart Federation (WHF), the International Union of Nutritional Sciences (IUNS) and the International Pediatric Association (IPA).

THE DIABETIC FOOT: AMPUTATIONS ARE PREVENTABLE

People with diabetes are at risk of neuropathy and problems with ischaemia, both of which can lead to foot ulcers and slow-healing wounds which, if they get infected, may result in amputation. IDF recommends that every individual with diabetes receive the best possible foot care.

THE RIGHTS OF THE CHILD 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 two primary methods used to monitor glucose levels. Urine glucose monitoring is not a substitute for blood glucose monitoring, but rather an alternative or complement which 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 patients in terms of increasing life expectancy and quality of life, and potentially in economic terms for society and healthcare payers.

WORLDWIDE DEFINITION OF THE METABOLIC SYNDROME

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

HBA1C WORKING GROUP

The measurement of glycated haemoglobin (HbA1c) is central to 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 (OSA). The IDF consensus statement on sleep apnoea and type 2 diabetes raises awareness of the association between the two conditions, which have significant implications on public health and on the lives of individuals.

Box 6.1. HbA1c and the diagnosis of diabetes

In March 2009, the World Health Organization (WHO) convened a consultation to update the 1999 and 2006 reports on the diagnosis and classification of diabetes. The central issue was whether to recommend HbA1c as a diagnostic test for diabetes. The members of the expert group included experts in diabetology, biochemistry, immunology, genetics, epidemiology and public health. The expert group were to look at how HbA1c performed in the diagnosis of type 2 diabetes, based on the detection and prediction of microvascular complications. A systematic review of the issue was conducted by the Boden Institute of Obesity, Nutrition and Exercise, The University of Sydney, Sydney, Australia.

The recommendation was drafted by the expert group following the process outlined in the *WHO Handbook for Guideline Development*. The decision process took into account the findings of the systematic review and the advantages and disadvantages of using HbA1c to diagnose diabetes. The expert group concluded that HbA1c can be used as a diagnostic test for diabetes, provided that stringent quality assurance tests are in place and assays are standardised to criteria aligned to the international reference values, and there are no conditions present which preclude its accurate measurement.

An HbA1c of 6.5% is recommended as the cut point for diagnosing diabetes. A value less than 6.5% does not exclude diabetes diagnosed using glucose tests. The expert group concluded that there is insufficient evidence at this time to make any formal recommendation on the interpretation of HbA1c levels below 6.5%.

The higher cost of HbA1c measurement in comparison to other diagnostic tools will, for now, make it harder for low-income countries to use. The priority for low-income countries will continue to be ensuring the availability of blood glucose measurement at primary health care level before widely introducing HbA1c for diagnosing diabetes.

The full report is available from:

www.who.int/diabetes/publications/report-hba1c_2011.pdf

DIABETICMedicine

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Article: Clinical Practice

Bariatric surgery: an IDF statement for obese Type 2 diabetes

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Abstract

The International Diabetes Federation Taskforce on Epidemiology and Prevention of Diabetes convened a consensus working group of diabetologists, endocrinologists, surgeons and public health experts to review the appropriate role of surgery and other gastrointestinal interventions in the treatment and prevention of Type 2 diabetes. The specific goals were: to develop practical recommendations for clinicians on patient selection; to identify barriers to surgical access and suggest interventions for health policy changes that ensure equitable access to surgery when indicated; and to identify priorities for research. Bariatric surgery can significantly improve glycaemic control in severely obese patients with Type 2 diabetes. It is an effective, safe and cost-effective therapy for obese Type 2 diabetes. Surgery can be considered an appropriate treatment for people with Type 2 diabetes and obesity not achieving recommended treatment targets with medical therapies, especially in the presence of other major co-morbidities. The procedures must be performed within accepted guidelines and require appropriate multidisciplinary assessment for the procedure, comprehensive patient education and ongoing care, as well as safe and standardized surgical procedures. National guidelines for bariatric surgery need to be developed for people with Type 2 diabetes and a BMI of 35 kg/m^2 or more.

Diabet. Med. 28, 628–642 (2011)

Review criteria

The working group reviewed literature focusing on bariatric surgery published between 1991 and 2010, in the areas of national and international guidelines, systematic reviews of the literature and high-quality clinical trials for the treatment of obesity and diabetes in adults and adolescents. The group synthesized the available evidence for efficacy, safety and cost-effectiveness of the established bariatric procedures in relation to current standard therapy for people with obesity and Type 2 diabetes. The group also explored weight loss and non-weight loss effects of the surgery on glycaemic control and novel gastrointestinal procedures and devices being developed to treat Type 2 diabetes. All papers identified were English-language, full-text papers.

Executive Summary

Text Box 1: Background

- Obesity and Type 2 diabetes are serious chronic diseases associated with complex metabolic dysfunctions that increase the risk for morbidity and mortality.
- The dramatic rise in the prevalence of obesity and diabetes has become a major global public health issue and demands urgent attention from governments, healthcare systems and the medical community.
- Continuing population-based efforts are essential to prevent the onset of obesity and Type 2 diabetes. At the same time, effective treatment must also be available for people who have developed Type 2 diabetes.
- Faced with the escalating global diabetes crisis, healthcare providers require as potent an armamentarium of therapeutic interventions as possible.
- In addition to behavioural and medical approaches, various types of surgery on the gastrointestinal tract, originally developed to treat morbid obesity ('bariatric surgery'), constitute powerful options to ameliorate diabetes in severely obese patients, often normalizing blood glucose levels, reducing or avoiding the need for medications and providing a potentially cost-effective approach to treating the disease.

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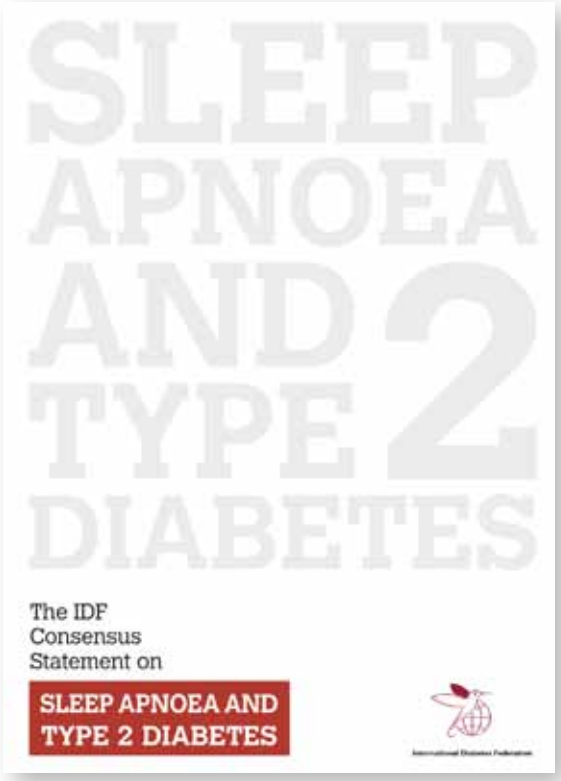

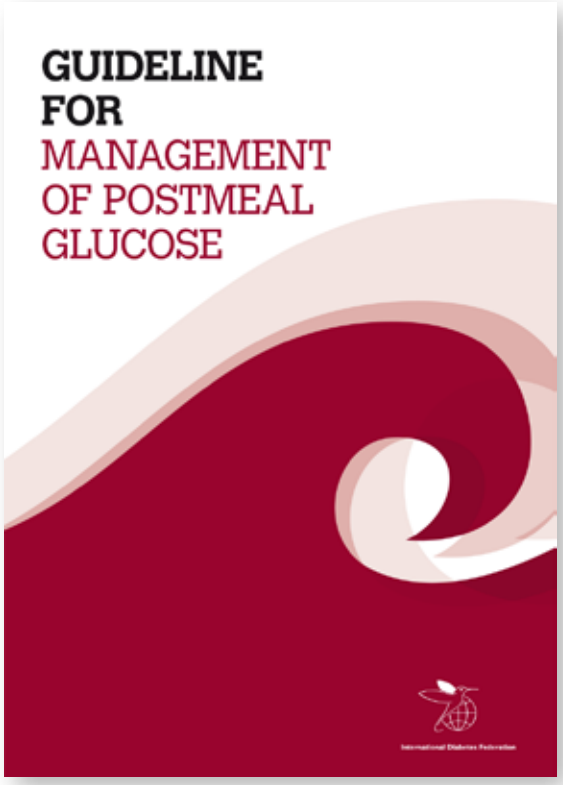

6.3. About the International Diabetes Federation

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 the collaboration between them. The Federation's national diabetes associations are divided 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).

IDF Executive Office

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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/region/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 Voice
www.idf.org/diabetesvoice

Insulin and Diabetes Supplies
www.idf.org/insulin-diabetes-supplies

Life for a Child
www.idf.org/lifeforachild

Women and Diabetes
www.idf.org/women-and-diabetes

World Diabetes Day
www.idf.org/worlddiabetesday

World Diabetes Congress
www.idf.org/worlddiabetescongress

Diabetes Education
www.idf.org/education

IDF Europe Policy Puzzle
www.idf.org/regions/europe/publications/diabetes-policy-audit

World Health Organization

Diabetes Action Online
www.who.int/diabetesactiononline

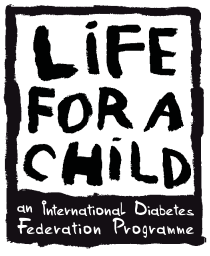
Diet and Physical Activity: a public health priority
www.who.int/dietphysicalactivity

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
www.who.int/chp/about/integrated_cd/en/index6.html
www.who.int/entity/chp/about/Report-Global-Survey-09.pdf



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 WHO Standard* (%)	Diabetes comparative prevalence Population Standard* (%)	Diabetes-related deaths (20-79)
Afghanistan	**MENA**	13,733.03	818.30	5.96	7.75	7.60	15,568
Albania	**EUR**	2,172.42	64.11	2.95	2.85	2.78	854
Algeria	**MENA**	22,619.94	1,435.12	6.34	7.04	6.95	9,395
Andorra	**EUR**	64.50	4.76	7.38	5.61	5.43	34
Angola	**AFR**	8,362.60	185.34	2.22	2.96	2.90	2,384
Anguilla	**NAC**	9.87	0.93	9.38	9.39	9.19	-
Antigua and Barbuda	**NAC**	56.49	7.25	12.83	12.83	12.51	93
Argentina	**SACA**	26,264.77	1,531.80	5.83	5.67	5.52	15,049
Armenia	**EUR**	2,138.55	191.65	8.96	8.65	8.49	2,150
Aruba	**NAC**	78.14	11.70	14.97	12.73	12.41	-
Australia	**WP**	15,947.25	1,292.09	8.10	6.84	6.64	7,325
Austria	**EUR**	6,285.97	570.99	9.08	6.78	6.56	4,322
Azerbaijan	**EUR**	6,398.87	167.14	2.61	2.83	2.76	2,735
Bahamas	**NAC**	235.89	28.78	12.20	12.40	12.10	292
Bahrain	**MENA**	986.21	150.80	15.29	19.88	19.47	545
Bangladesh	**SEA**	87,708.08	8,405.61	9.58	10.65	10.52	144,443
Barbados	**NAC**	199.30	29.11	14.61	12.71	12.37	263
Belarus	**EUR**	7,239.12	676.63	9.35	8.16	7.95	10,045
Belgium	**EUR**	7,768.53	514.90	6.63	4.92	4.77	4,331
Belize	**NAC**	169.74	24.45	14.41	17.37	17.04	276
Benin	**AFR**	4,133.93	70.63	1.71	2.00	1.97	1,001
Bermuda	**NAC**	45.32	6.49	14.32	12.26	11.97	-
Bhutan	**SEA**	443.24	21.48	4.85	5.81	5.70	120
Bolivia (Plurinational State of)	**SACA**	5,337.90	303.28	5.68	6.77	6.60	4,431
Bosnia and Herzegovina	**EUR**	2,875.57	264.86	9.21	7.73	7.53	2,535
Botswana	**AFR**	1,146.85	93.88	8.19	11.09	10.76	1,252
Brazil	**SACA**	127,994.78	12,439.97	9.72	10.36	10.08	121,082

*See Glossary – standard population

estimates for 2011

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 WHO Standard* (%)	IGT comparative prevalence Population Standard* (%)	COUNTRY/ TERRITORY
-	81	819.80	5.97	7.33	7.23	**Afghanistan**
-	448	212.52	9.78	9.64	9.49	**Albania**
8.6	415	1,186.83	5.25	5.82	5.74	**Algeria**
-	3,910	6.04	9.37	7.67	7.49	**Andorra**
-	277	628.94	7.52	9.19	9.06	**Angola**
-	-	1.05	10.61	10.62	10.45	**Anguilla**
3.5	915	6.33	11.20	11.20	11.00	**Antigua and Barbuda**
6.8	967	1,699.14	6.47	6.35	6.24	**Argentina**
-	186	169.39	7.92	7.68	7.56	**Armenia**
-	-	9.59	12.27	11.05	10.86	**Aruba**
22.5	4,878	1,585.79	9.94	8.80	8.62	**Australia**
13.3	5,641	573.89	9.13	7.45	7.28	**Austria**
-	366	591.46	9.24	9.68	9.54	**Azerbaijan**
10.1	2,056	25.16	10.67	10.77	10.59	**Bahamas**
-	1,331	140.55	14.25	16.46	16.27	**Bahrain**
-	27	2,141.15	2.44	2.81	2.77	**Bangladesh**
2.0	1,139	24.04	12.06	11.10	10.91	**Barbados**
5.6	412	802.01	11.08	10.22	10.06	**Belarus**
15.4	5,862	752.99	9.69	7.80	7.62	**Belgium**
-	299	15.84	9.33	11.01	10.82	**Belize**
-	60	440.14	10.65	11.81	11.69	**Benin**
-	-	5.35	11.80	10.65	10.48	**Bermuda**
-	174	11.83	2.67	2.99	2.96	**Bhutan**
-	125	347.23	6.51	7.25	7.12	**Bolivia (Plurinational State of)**
3.5	629	306.46	10.66	9.62	9.48	**Bosnia and Herzegovina**
-	816	84.01	7.33	8.95	8.81	**Botswana**
7.7	1,038	5,354.54	4.18	4.38	4.29	**Brazil**

Country summary table: estimates for 2011

COUNTRY/ TERRITORY	IDF REGION	Adult Population (20-79) in 1000s	Diabetes cases (20-79) in 1000s	Diabetes national prevalence (%)	Diabetes comparative prevalence WHO Standard* (%)	Diabetes comparative prevalence Population Standard* (%)	Diabetes-related deaths (20-79)
British Virgin Islands	NAC	14.80	1.30	8.77	8.78	8.59	-
Brunei Darussalam	WP	265.84	19.26	7.25	9.72	9.40	205
Bulgaria	EUR	5,744.63	531.55	9.25	6.87	6.65	8,205
Burkina Faso	AFR	7,421.61	175.13	2.36	3.03	2.98	3,231
Burundi	AFR	4,352.53	94.22	2.16	2.75	2.70	1,860
Cambodia	WP	8,079.64	199.37	2.47	2.92	2.86	4,895
Cameroon	AFR	9,676.35	501.44	5.18	6.22	6.13	10,829
Canada	NAC	25,140.88	2,716.14	10.80	8.66	8.40	17,638
Cape Verde	AFR	280.94	13.13	4.67	5.48	5.39	112
Cayman Islands	NAC	35.76	4.38	12.25	12.26	11.97	-
Central African Republic	AFR	2,179.77	58.16	2.67	3.23	3.17	1,267
Chad	AFR	5,037.08	197.05	3.91	3.85	3.86	6,059
Channel Islands	EUR	116.41	7.95	6.83	5.06	4.91	-
Chile	SACA	11,680.53	1,190.05	10.19	9.75	9.50	7,927
China	WP	968,974.93	90,045.09	9.29	9.01	8.80	1,133,918
China, Hong Kong SAR	WP	5,603.57	525.39	9.38	7.83	7.61	-
China, Macao SAR	WP	436.88	32.71	7.49	7.39	7.18	-
Colombia	SACA	28,724.04	2,609.28	9.08	10.02	9.75	19,572
Comoros	AFR	358.49	23.48	6.55	8.57	8.39	174
Congo	AFR	2,019.02	94.61	4.69	5.58	5.49	1,424
Cook Islands	WP	11.75	0.96	8.19	8.80	8.58	5
Costa Rica	SACA	3,075.60	271.21	8.82	9.90	9.58	1,707
Côte d'Ivoire	AFR	9,676.59	406.50	4.20	4.97	4.89	4,271
Croatia	EUR	3,313.59	218.84	6.60	5.29	5.16	2,271
Cuba	SACA	8,264.82	939.05	11.36	9.75	9.44	7,983
Cyprus	EUR	809.00	81.84	10.12	9.53	9.30	456

*See Glossary – standard population

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 WHO Standard* (%)	IGT comparative prevalence Population Standard* (%)	COUNTRY/ TERRITORY
-	-	1.64	11.11	11.11	10.91	**British Virgin Islands**
-	1,221	28.80	10.83	12.04	11.85	**Brunei Darussalam**
9.4	532	126.23	2.20	1.74	1.69	**Bulgaria**
-	69	662.38	8.93	10.15	10.05	**Burkina Faso**
-	35	326.15	7.49	8.48	8.40	**Burundi**
-	82	720.21	8.91	9.82	9.70	**Cambodia**
-	109	693.23	7.16	8.82	8.68	**Cameroon**
21.7	5,106	3,066.44	12.20	10.79	10.61	**Canada**
-	242	21.12	7.52	8.97	8.83	**Cape Verde**
-	-	3.80	10.61	10.62	10.45	**Cayman Islands**
-	34	226.84	10.41	11.41	11.30	**Central African Republic**
-	86	464.10	9.21	10.22	10.12	**Chad**
-	-	10.29	8.84	7.03	6.86	**Channel Islands**
6.6	1,042	761.53	6.52	6.32	6.21	**Chile**
0.6	194	23,372.97	2.41	2.30	2.26	**China**
2.0	2,059	833.25	14.87	13.47	13.28	**China, Hong Kong SAR**
-	1,072	58.62	13.42	13.14	12.95	**China, Macao SAR**
1.3	480	1,633.75	5.69	6.00	5.90	**Colombia**
-	46	32.92	9.18	10.21	10.11	**Comoros**
-	143	150.57	7.46	9.00	8.86	**Congo**
-	501	1.36	11.55	12.04	11.85	**Cook Islands**
-	924	172.77	5.62	5.92	5.82	**Costa Rica**
-	107	677.46	7.00	8.33	8.20	**Côte d'Ivoire**
9.1	1,443	304.63	9.19	7.33	7.16	**Croatia**
2.3	811	556.99	6.74	6.11	6.01	**Cuba**
14.9	2,162	52.95	6.55	6.19	6.06	**Cyprus**

Country summary table: estimates for 2011

COUNTRY/ TERRITORY	IDF REGION	Adult Population (20-79) in 1000s	Diabetes cases (20-79) in 1000s	Diabetes national prevalence (%)	Diabetes comparative prevalence WHO Standard* (%)	Diabetes comparative prevalence Population Standard* (%)	Diabetes-related deaths (20-79)
Czech Republic	EUR	8,049.46	557.39	6.92	5.46	5.29	5,889
Dem. People's Republic of Korea	WP	16,599.41	1,507.50	9.08	8.60	8.42	33,322
Democratic Republic of the Congo	AFR	28,894.31	730.74	2.53	3.18	3.12	52,949
Denmark	EUR	3,989.72	299.47	7.51	5.72	5.57	2,726
Djibouti	AFR	480.95	26.06	5.42	6.40	6.30	359
Dominica	NAC	42.66	3.86	9.04	9.05	8.86	35
Dominican Republic	SACA	5,846.80	431.64	7.38	8.29	8.06	5,450
Ecuador	SACA	8,692.62	524.18	6.03	6.78	6.60	5,126
Egypt	MENA	48,305.23	7,323.37	15.16	16.94	16.60	65,003
El Salvador	SACA	3,449.41	293.07	8.50	9.65	9.43	3,056
Equatorial Guinea	AFR	362.51	14.03	3.87	4.27	4.20	216
Eritrea	AFR	2,595.54	95.49	3.68	3.56	3.57	1,280
Estonia	EUR	1,001.32	90.71	9.06	7.23	7.03	1,264
Ethiopia	AFR	39,914.63	1,377.28	3.45	3.41	3.41	25,491
Fiji	WP	531.72	55.37	10.41	11.12	10.88	994
Finland	EUR	3,907.83	340.32	8.71	6.01	5.80	2,753
France	EUR	44,328.97	3,237.59	7.30	5.56	5.38	21,782
French Guiana	SACA	134.50	12.01	8.93	9.89	9.62	-
French Polynesia	WP	179.00	14.93	8.34	8.81	8.59	-
Gabon	AFR	812.00	68.60	8.45	10.61	10.33	704
Gambia	AFR	802.93	12.29	1.53	1.99	1.96	144
Georgia	EUR	3,155.24	104.64	3.32	2.83	2.77	1,432
Germany	EUR	62,810.27	5,022.23	8.00	5.51	5.33	42,971
Ghana	AFR	12,655.47	517.43	4.09	5.11	5.00	6,108
Greece	EUR	8,595.69	603.36	7.02	5.27	5.11	4,858
Grenada	NAC	63.60	4.83	7.59	8.78	8.60	68

*See Glossary – standard population

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 WHO Standard* (%)	IGT comparative prevalence Population Standard* (%)	COUNTRY/ TERRITORY
17.2	1,690	718.54	8.93	7.50	7.33	**Czech Republic**
-	17	1,798.37	10.83	10.53	10.42	**Dem. People's Republic of Korea**
-	25	2,850.72	9.87	11.05	10.94	**Democratic Republic of the Congo**
22.2	6,963	460.60	11.54	10.05	9.91	**Denmark**
-	131	39.32	8.18	9.77	9.62	**Djibouti**
5.7	457	4.65	10.89	10.89	10.71	**Dominica**
0.5	414	326.00	5.58	5.99	5.88	**Dominican Republic**
-	337	477.09	5.49	5.93	5.83	**Ecuador**
8.0	136	3,304.70	6.84	7.45	7.35	**Egypt**
-	336	177.18	5.14	5.66	5.56	**El Salvador**
-	922	25.84	7.13	7.71	7.58	**Equatorial Guinea**
-	17	217.70	8.39	9.68	9.58	**Eritrea**
17.1	1,222	93.00	9.29	7.34	7.11	**Estonia**
0.3	25	3,266.49	8.18	9.00	8.91	**Ethiopia**
-	230	56.36	10.60	11.11	10.96	**Fiji**
57.6	4,976	381.71	9.77	6.93	6.71	**Finland**
12.2	5,632	4,167.39	9.40	7.66	7.48	**France**
-	-	7.83	5.82	6.12	6.01	**French Guiana**
-	-	18.96	10.59	10.95	10.76	**French Polynesia**
-	387	71.99	8.87	10.32	10.16	**Gabon**
-	46	95.11	11.85	13.45	13.32	**Gambia**
4.6	332	337.11	10.68	9.75	9.60	**Georgia**
18.0	5,098	5,527.50	8.80	6.31	6.13	**Germany**
-	113	1,477.32	11.67	12.70	12.58	**Ghana**
10.4	3,419	779.90	9.07	7.37	7.20	**Greece**
-	742	6.40	10.06	11.14	10.94	**Grenada**

Country summary table: estimates for 2011

COUNTRY/ TERRITORY	IDF REGION	Adult Population (20-79) in 1000s	Diabetes cases (20-79) in 1000s	Diabetes national prevalence (%)	Diabetes comparative prevalence WHO Standard* (%)	Diabetes comparative prevalence Population Standard* (%)	Diabetes-related deaths (20-79)
Guadeloupe	**NAC**	309.42	23.91	7.73	6.49	6.33	-
Guam	**WP**	114.51	10.32	9.01	8.81	8.59	-
Guatemala	**SACA**	6,936.89	533.26	7.69	9.48	9.27	6,585
Guinea	**AFR**	4,722.81	181.79	3.85	4.42	4.36	2,348
Guinea-Bissau	**AFR**	739.67	19.13	2.59	3.09	3.04	332
Guyana	**NAC**	422.61	65.60	15.52	16.99	16.66	1,260
Haiti	**NAC**	5,369.86	295.46	5.50	6.79	6.63	6,012
Honduras	**SACA**	4,007.57	216.86	5.41	6.83	6.69	2,133
Hungary	**EUR**	7,520.79	568.38	7.56	6.19	6.03	7,353
Iceland	**EUR**	222.23	8.61	3.88	3.32	3.20	56
India	**SEA**	737,003.33	61,258.43	8.31	9.16	8.99	983,203
Indonesia	**WP**	154,277.59	7,291.92	4.73	5.21	5.10	149,872
Iran (Islamic Republic of)	**MENA**	50,322.30	4,694.97	9.33	11.34	11.12	30,475
Iraq	**MENA**	15,068.67	1,089.01	7.23	9.33	9.13	13,085
Ireland	**EUR**	3,152.06	191.38	6.07	5.38	5.21	1,457
Israel	**EUR**	4,707.76	400.31	8.50	7.64	7.37	2,777
Italy	**EUR**	45,637.08	3,560.39	7.80	5.32	5.13	26,111
Jamaica	**NAC**	1,641.52	258.48	15.75	15.97	15.70	2,254
Japan	**WP**	95,340.66	10,674.32	11.20	7.93	7.71	81,446
Jordan	**MENA**	3,268.36	291.57	8.92	12.37	12.06	2,118
Kazakhstan	**EUR**	10,662.65	801.18	7.51	7.91	7.71	14,857
Kenya	**AFR**	19,425.83	769.29	3.96	5.23	5.14	13,269
Kiribati	**WP**	60.27	15.02	24.92	25.72	25.27	162
Kuwait	**MENA**	1,868.91	297.99	15.94	21.10	20.67	799
Kyrgyzstan	**EUR**	3,142.09	154.23	4.91	6.52	6.31	2,514
Lao People's Democratic Republic	**WP**	3,368.77	90.09	2.67	3.33	3.26	2,479
Latvia	**EUR**	1,709.86	166.26	9.72	8.05	7.84	1,817
Lebanon	**MENA**	2,788.60	527.94	18.93	20.17	19.58	4,525
Lesotho	**AFR**	1,106.37	29.14	2.63	3.48	3.42	1,339
Liberia	**AFR**	1,900.33	51.02	2.68	3.37	3.31	716

*See Glossary – standard population

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 WHO Standard* (%)	IGT comparative prevalence Population Standard* (%)	COUNTRY/ TERRITORY
-	-	36.71	11.86	10.59	10.42	**Guadeloupe**
-	-	14.94	13.04	12.79	12.60	**Guam**
-	314	321.40	4.63	5.49	5.39	**Guatemala**
-	37	473.50	10.03	11.00	10.90	**Guinea**
-	31	70.54	9.54	10.43	10.33	**Guinea-Bissau**
-	165	43.22	10.23	11.21	11.02	**Guyana**
-	68	212.26	3.95	4.69	4.59	**Haiti**
-	211	189.22	4.72	5.63	5.53	**Honduras**
11.3	1,274	679.18	9.03	7.44	7.27	**Hungary**
14.7	6,278	19.16	8.62	7.75	7.57	**Iceland**
4.2	68	20,467.50	2.78	2.99	2.95	**India**
-	80	12,190.22	7.90	8.27	8.18	**Indonesia**
3.7	405	2,523.37	5.01	5.70	5.62	**Iran (Islamic Republic of)**
-	182	945.39	6.27	7.57	7.45	**Iraq**
16.3	6,629	254.55	8.08	7.39	7.22	**Ireland**
10.4	2,748	388.35	8.25	7.73	7.55	**Israel**
12.1	3,541	4,342.57	9.52	7.45	7.28	**Italy**
-	335	177.82	10.83	11.00	10.81	**Jamaica**
2.4	3,266	13,638.16	14.30	11.66	11.47	**Japan**
3.2	544	220.69	6.75	8.44	8.29	**Jordan**
-	468	1,020.82	9.57	9.87	9.72	**Kazakhstan**
-	57	1,818.37	9.36	10.66	10.55	**Kenya**
-	232	5.23	8.68	8.92	8.80	**Kiribati**
22.3	1,336	293.65	15.71	18.10	17.89	**Kuwait**
-	79	147.31	4.69	6.10	5.92	**Kyrgyzstan**
-	62	292.20	8.67	9.65	9.54	**Lao People's Democratic Republic**
7.5	1,101	192.13	11.24	10.04	9.88	**Latvia**
-	767	206.17	7.39	7.62	7.51	**Lebanon**
-	101	59.17	5.35	7.09	6.97	**Lesotho**
-	47	210.51	11.08	12.36	12.23	**Liberia**

Country summary table: estimates for 2011

COUNTRY/ TERRITORY	IDF REGION	Adult Population (20-79) in 1000s	Diabetes cases (20-79) in 1000s	Diabetes national prevalence (%)	Diabetes comparative prevalence WHO Standard* (%)	Diabetes comparative prevalence Population Standard* (%)	Diabetes-related deaths (20-79)
Libyan Arab Jamahiriya	MENA	3,875.03	436.38	11.26	14.19	13.84	2,705
Liechtenstein	EUR	26.71	1.78	6.68	4.89	4.74	11
Lithuania	EUR	2,470.20	235.88	9.55	8.04	7.83	3,261
Luxembourg	EUR	375.27	21.10	5.62	4.65	4.50	161
Madagascar	AFR	9,770.26	428.01	4.38	4.77	4.73	5,407
Malawi	AFR	6,563.53	352.26	5.37	5.66	5.63	11,405
Malaysia	WP	17,402.66	2,029.88	11.66	12.30	12.07	24,938
Maldives	SEA	198.91	15.20	7.64	9.38	9.21	141
Mali	AFR	6,660.71	99.83	1.50	1.96	1.92	1,545
Malta	EUR	316.04	30.11	9.53	6.92	6.64	228
Marshall Islands	WP	32.69	7.02	21.49	22.17	21.79	172
Martinique	NAC	284.49	42.95	15.10	12.36	12.06	-
Mauritania	AFR	1,756.35	60.58	3.45	4.36	4.27	644
Mauritius	SEA	898.90	138.18	15.37	15.11	14.76	1,609
Mexico	NAC	69,323.99	10,293.68	14.85	15.89	15.57	71,087
Micronesia (Fed. States of)	WP	57.49	7.75	13.48	15.96	15.66	105
Monaco	EUR	26.07	2.06	7.88	5.74	5.56	12
Mongolia	WP	1,741.95	117.46	6.74	7.17	7.12	2,644
Montenegro	EUR	455.06	41.93	9.21	7.93	7.73	506
Morocco	MENA	19,964.62	1,267.87	6.35	6.96	6.82	6,992
Mozambique	AFR	10,767.39	294.72	2.74	3.14	3.11	8,805
Myanmar	WP	31,390.42	2,103.67	6.70	7.23	7.09	58,889
Namibia	AFR	1,216.34	74.11	6.09	7.99	7.78	872
Nauru	WP	6.15	1.23	20.08	20.71	20.37	20
Nepal	SEA	16,135.93	488.20	3.03	3.68	3.59	11,297
Netherlands	EUR	12,059.21	881.63	7.31	5.42	5.25	7,054
Netherlands Antilles	NAC	146.39	20.64	14.10	12.32	12.02	-
New Caledonia	WP	165.07	14.57	8.83	8.78	8.56	-
New Zealand	WP	3,040.53	312.12	10.27	8.78	8.56	1,916

*See Glossary – standard population

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 WHO Standard* (%)	IGT comparative prevalence Population Standard* (%)	COUNTRY/ TERRITORY
9.0	699	255.38	6.59	7.53	7.42	**Libyan Arab Jamahiriya**
-	-	2.31	8.64	6.83	6.67	**Liechtenstein**
7.8	1,093	274.59	11.12	10.03	9.87	**Lithuania**
15.5	9,341	33.00	8.79	7.66	7.48	**Luxembourg**
-	38	930.82	9.53	10.45	10.35	**Madagascar**
-	31	552.81	8.42	9.38	9.29	**Malawi**
-	511	3,160.83	18.16	18.44	18.36	**Malaysia**
-	803	8.49	4.27	4.81	4.76	**Maldives**
-	70	654.10	9.82	11.22	11.10	**Mali**
15.6	1,611	26.86	8.50	6.85	6.68	**Malta**
-	519	2.97	9.08	9.33	9.21	**Marshall Islands**
-	-	34.85	12.25	10.69	10.51	**Martinique**
-	48	184.81	10.52	11.68	11.56	**Mauritania**
1.4	478	95.34	10.61	10.48	10.34	**Mauritius**
1.5	815	7,071.91	10.20	10.79	10.61	**Mexico**
-	472	4.40	7.65	8.61	8.49	**Micronesia (Fed. States of)**
-	7,128	2.57	9.86	7.82	7.64	**Monaco**
-	107	136.95	7.86	8.53	8.46	**Mongolia**
16.3	-	48.88	10.74	9.84	9.69	**Montenegro**
-	235	1,408.33	7.05	7.55	7.44	**Morocco**
-	37	1,125.75	10.46	11.52	11.40	**Mozambique**
-	16	2,635.69	8.40	8.84	8.74	**Myanmar**
-	468	78.36	6.44	7.68	7.56	**Namibia**
-	987	0.58	9.47	9.74	9.62	**Nauru**
-	44	316.04	1.96	2.23	2.20	**Nepal**
18.6	6,119	1,143.34	9.48	7.63	7.46	**Netherlands**
-	-	17.15	11.72	10.62	10.45	**Netherlands Antilles**
-	-	18.69	11.32	11.24	11.06	**New Caledonia**
18.0	3,401	419.11	13.78	12.53	12.34	**New Zealand**

Country summary table: estimates for 2011

COUNTRY/ TERRITORY	IDF REGION	Adult Population (20-79) in 1000s	Diabetes cases (20-79) in 1000s	Diabetes national prevalence (%)	Diabetes comparative prevalence WHO Standard* (%)	Diabetes comparative prevalence Population Standard* (%)	Diabetes-related deaths (20-79)
Nicaragua	**SACA**	3,163.28	282.81	8.94	11.20	10.95	2,774
Niger	**AFR**	6,511.23	283.85	4.36	4.13	4.16	5,919
Nigeria	**AFR**	75,551.39	3,054.51	4.04	4.87	4.79	63,340
Niue	**WP**	0.82	0.08	9.47	10.05	9.82	0
Norway	**EUR**	3,454.70	202.08	5.85	4.82	4.69	1,275
Occupied Palestinian Territory	**MENA**	1,896.00	124.49	6.57	9.38	9.15	-
Oman	**MENA**	1,810.34	138.40	7.64	10.75	10.54	704
Pakistan	**MENA**	94,446.95	6,349.22	6.72	8.04	7.89	65,735
Palau	**WP**	12.29	1.35	10.99	11.38	11.10	17
Panama	**SACA**	2,190.77	196.20	8.96	9.75	9.44	1,463
Papua New Guinea	**WP**	3,553.71	216.82	6.10	7.74	7.56	5,189
Paraguay	**SACA**	3,648.46	204.99	5.62	6.65	6.48	2,005
Peru	**SACA**	17,503.74	942.23	5.38	6.11	5.95	7,010
Philippines	**WP**	51,334.85	4,219.71	8.22	9.96	9.72	58,798
Poland	**EUR**	28,917.50	3,057.46	10.57	9.23	9.03	29,959
Portugal	**EUR**	8,028.82	1,021.36	12.72	9.82	9.55	7,822
Puerto Rico	**SACA**	2,546.52	388.48	15.26	13.33	12.98	-
Qatar	**MENA**	1,541.96	216.89	14.07	20.17	19.75	457
Republic of Korea	**WP**	36,204.09	3,186.39	8.80	7.72	7.53	28,912
Republic of Moldova	**EUR**	2,609.95	80.03	3.07	2.79	2.72	1,449
Réunion	**AFR**	552.15	92.64	16.78	16.39	15.99	-
Romania	**EUR**	16,349.28	1,506.30	9.21	7.89	7.69	18,433
Russian Federation	**EUR**	109,166.98	12,593.15	11.54	10.02	9.74	217,185
Rwanda	**AFR**	5,147.16	126.23	2.45	3.16	3.11	1,918
Saint Kitts and Nevis	**NAC**	33.44	2.90	8.68	8.69	8.50	40
Saint Lucia	**NAC**	111.54	8.64	7.75	8.57	8.39	79

*See Glossary – standard population

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 WHO Standard* (%)	IGT comparative prevalence Population Standard* (%)	COUNTRY/ TERRITORY
-	174	324.70	10.26	11.46	11.33	**Nicaragua**
-	39	533.51	8.19	8.99	8.90	**Niger**
2.9	129	5,175.11	6.85	8.33	8.20	**Nigeria**
-	1,836	0.07	8.49	8.79	8.67	**Niue**
27.9	9,269	312.84	9.06	7.59	7.41	**Norway**
-	-	77.40	4.08	5.36	5.26	**Occupied Palestinian Territory**
2.5	763	148.82	8.22	9.74	9.63	**Oman**
0.5	36	7,198.00	7.62	8.65	8.52	**Pakistan**
-	1,318	1.14	9.25	9.51	9.39	**Palau**
-	722	128.48	5.86	6.10	6.00	**Panama**
0.1	68	262.71	7.39	8.46	8.34	**Papua New Guinea**
0.9	284	190.36	5.22	5.86	5.76	**Paraguay**
0.5	311	988.50	5.65	6.12	6.01	**Peru**
-	109	6,411.07	12.49	14.62	14.33	**Philippines**
17.3	1,143	5,223.87	18.06	16.64	16.41	**Poland**
13.2	2,522	1,113.82	13.87	11.40	11.16	**Portugal**
16.8	-	177.95	6.99	6.43	6.32	**Puerto Rico**
11.4	2,269	212.94	13.81	16.76	16.55	**Qatar**
1.1	1,615	4,869.31	13.45	12.38	12.18	**Republic of Korea**
-	257	266.06	10.19	9.60	9.46	**Republic of Moldova**
-	-	61.30	11.10	10.79	10.62	**Réunion**
5.4	607	1,750.37	10.71	9.76	9.61	**Romania**
12.1	649	11,989.76	10.98	10.19	10.03	**Russian Federation**
-	82	420.73	8.17	9.28	9.19	**Rwanda**
-	881	3.74	11.18	11.18	10.98	**Saint Kitts and Nevis**
-	605	11.56	10.36	11.21	11.02	**Saint Lucia**

Country summary table: estimates for 2011

COUNTRY/ TERRITORY	IDF REGION	Adult Population (20-79) in 1000s	Diabetes cases (20-79) in 1000s	Diabetes national prevalence (%)	Diabetes comparative prevalence WHO Standard* (%)	Diabetes comparative prevalence Population Standard* (%)	Diabetes-related deaths (20-79)
Saint Vincent and the Grenadines	NAC	68.84	5.84	8.49	8.95	8.76	78
Samoa	WP	92.97	6.55	7.05	7.91	7.68	151
San Marino	EUR	23.76	1.77	7.46	5.67	5.49	13
Sao Tome and Principe	AFR	81.06	3.60	4.45	5.59	5.50	41
Saudi Arabia	MENA	17,023.18	2,759.56	16.21	20.02	19.62	15,399
Senegal	AFR	5,785.52	146.48	2.53	3.28	3.23	1,694
Serbia	EUR	7,177.21	671.02	9.35	7.86	7.66	8,441
Seychelles	AFR	39.60	3.52	8.89	12.42	12.09	18
Sierra Leone	AFR	2,794.30	72.07	2.58	3.22	3.16	1,539
Singapore	WP	3,838.91	426.69	11.11	9.76	9.45	3,663
Slovakia	EUR	4,144.95	275.50	6.65	5.87	5.71	3,136
Slovenia	EUR	1,563.08	160.42	10.26	7.77	7.52	1,448
Solomon Islands	WP	274.79	34.48	12.55	15.61	15.31	462
Somalia	AFR	4,275.71	185.14	4.33	4.26	4.26	4,065
South Africa	AFR	30,111.82	1,946.63	6.46	7.11	7.02	47,745
Spain	EUR	34,895.55	2,840.11	8.14	6.53	6.32	19,518
Sri Lanka	SEA	13,893.83	1,079.78	7.77	7.61	7.48	15,203
Sudan	MENA	22,000.17	1,666.63	7.58	8.72	8.60	24,619
Suriname	NAC	329.90	28.55	8.65	9.10	8.91	387
Swaziland	AFR	589.29	13.90	2.36	3.12	3.07	527
Sweden	EUR	6,763.94	386.37	5.71	4.36	4.24	2,610
Switzerland	EUR	5,707.67	423.78	7.42	6.00	5.86	2,411
Syrian Arab Republic	MENA	10,824.52	889.52	8.22	10.15	9.89	6,066
Taiwan	WP	17,355.82	1,664.54	9.59	8.54	8.28	-
Tajikistan	EUR	3,543.86	155.45	4.39	6.53	6.31	2,114
TFYR Macedonia	EUR	1,513.20	134.93	8.92	7.91	7.71	1,507
Thailand	WP	49,088.01	4,014.33	8.18	7.71	7.54	78,846
Timor-Leste	WP	484.17	29.98	6.19	7.63	7.46	644

*See Glossary – standard population

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 WHO Standard* (%)	IGT comparative prevalence Population Standard* (%)	COUNTRY/ TERRITORY
-	395	7.28	10.57	11.04	10.86	Saint Vincent and the Grenadines
-	312	5.86	6.30	6.67	6.56	Samoa
-	4,759	2.25	9.45	7.75	7.57	San Marino
-	162	5.68	7.01	9.05	8.91	Sao Tome and Principe
31.4	998	177.38	1.04	1.33	1.30	Saudi Arabia
-	111	603.39	10.43	11.81	11.69	Senegal
12.9	585	771.47	10.75	9.70	9.55	Serbia
-	590	2.90	7.31	9.24	9.11	Seychelles
-	83	284.19	10.17	11.34	11.23	Sierra Leone
2.5	1,691	524.36	13.66	12.59	12.39	Singapore
13.6	1,764	335.65	8.10	7.29	7.12	Slovakia
11.1	2,461	138.48	8.86	7.23	7.07	Slovenia
-	107	20.23	7.36	8.50	8.38	Solomon Islands
-	20	438.26	10.25	11.27	11.16	Somalia
-	695	2,113.11	7.02	7.99	7.83	South Africa
13.0	3,319	2,746.96	7.87	6.95	6.83	Spain
-	117	767.28	5.52	5.48	5.44	Sri Lanka
10.1	152	2,086.64	9.48	10.40	10.29	Sudan
-	610	34.50	10.46	10.89	10.71	Suriname
-	246	30.39	5.16	6.75	6.64	Swaziland
43.1	5,442	422.32	6.24	5.35	5.27	Sweden
9.2	7,731	523.86	9.18	7.52	7.35	Switzerland
-	122	718.27	6.64	7.48	7.38	Syrian Arab Republic
3.8	1,314	2,015.72	11.61	10.82	10.63	Taiwan
1.2	61	152.45	4.30	6.20	6.01	Tajikistan
3.9	419	158.29	10.46	9.74	9.59	TFYR Macedonia
0.3	238	4,479.31	9.13	8.81	8.70	Thailand
-	130	37.12	7.67	8.66	8.54	Timor-Leste

Country summary table: estimates for 2011

COUNTRY/ TERRITORY	IDF REGION	Adult Population (20-79) in 1000s	Diabetes cases (20-79) in 1000s	Diabetes national prevalence (%)	Diabetes comparative prevalence WHO Standard* (%)	Diabetes comparative prevalence Population Standard* (%)	Diabetes-related deaths (20-79)
Togo	**AFR**	3,037.30	81.16	2.67	3.30	3.25	6,928
Tokelau	**WP**	0.65	0.07	11.09	11.81	11.52	-
Tonga	**WP**	52.96	6.13	11.58	12.95	12.69	98
Trinidad and Tobago	**NAC**	952.97	117.52	12.33	13.05	12.72	1,354
Tunisia	**MENA**	7,084.33	629.58	8.89	9.68	9.46	3,741
Turkey	**EUR**	47,322.40	3,502.27	7.40	8.12	7.90	31,931
Turkmenistan	**EUR**	3,048.38	69.78	2.29	2.81	2.74	1,291
Tuvalu	**WP**	5.67	1.06	18.65	19.50	19.15	21
Uganda	**AFR**	13,932.24	307.91	2.21	2.88	2.84	1,913
Ukraine	**EUR**	34,542.77	1,195.98	3.46	2.93	2.86	23,103
United Arab Emirates	**MENA**	6,107.36	767.99	12.57	19.22	18.82	1,427
United Kingdom	**EUR**	44,813.07	3,063.91	6.84	5.35	5.19	25,052
United Republic of Tanzania	**AFR**	20,498.94	472.88	2.31	2.82	2.78	6,638
United States of America	**NAC**	216,804.84	23,721.76	10.94	9.55	9.35	179,612
United States Virgin Islands	**NAC**	75.36	11.82	15.68	12.38	12.10	-
Uruguay	**SACA**	2,237.11	148.61	6.64	5.89	5.74	1,060
Uzbekistan	**EUR**	16,397.35	812.94	4.96	6.65	6.44	11,449
Vanuatu	**WP**	125.53	17.26	13.75	16.36	16.06	250
Venezuela (Bolivarian Republic of)	**SACA**	17,838.46	1,674.56	9.39	10.48	10.20	12,730
Viet Nam	**WP**	58,408.07	1,702.73	2.92	3.23	3.17	27,949
Western Sahara	**AFR**	344.35	21.44	6.23	6.14	6.15	-
Yemen	**MENA**	10,902.12	727.10	6.67	9.87	9.62	7,067
Zambia	**AFR**	5,717.29	243.76	4.26	4.84	4.80	8,277
Zimbabwe	**AFR**	6,164.72	550.86	8.94	9.86	9.79	26,096
WORLD		**4,408,849.22**	**366,269.12**	**8.31**	**8.50**		**4,593,109**

*See Glossary – standard population

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 WHO Standard* (%)	IGT comparative prevalence Population Standard* (%)	COUNTRY/ TERRITORY
-	67	327.14	10.77	11.92	11.80	**Togo**
-	-	0.06	9.37	9.69	9.57	**Tokelau**
-	221	3.81	7.19	7.85	7.73	**Tonga**
-	1,180	103.10	10.82	11.33	11.13	**Trinidad and Tobago**
7.3	362	503.98	7.11	7.52	7.41	**Tunisia**
-	933	3,161.70	6.68	7.07	6.94	**Turkey**
-	143	259.46	8.51	9.63	9.48	**Turkmenistan**
-	377	0.49	8.67	8.97	8.86	**Tuvalu**
-	84	1,057.41	7.59	8.64	8.55	**Uganda**
8.1	332	3,862.23	11.18	10.10	9.95	**Ukraine**
-	1,775	817.82	13.39	16.44	16.25	**United Arab Emirates**
24.5	4,267	4,119.31	9.19	7.59	7.41	**United Kingdom**
0.9	40	2,170.32	10.59	12.16	12.00	**United Republic of Tanzania**
23.7	8,468	25,948.70	11.97	10.79	10.61	**United States of America**
12.8	-	9.45	12.54	10.60	10.43	**United States Virgin Islands**
8.3	927	153.29	6.85	6.33	6.22	**Uruguay**
1.2	80	764.91	4.66	6.12	5.94	**Uzbekistan**
-	160	9.61	7.66	8.63	8.51	**Vanuatu**
0.1	916	1,071.71	6.01	6.42	6.31	**Venezuela (Bolivarian Republic of)**
-	123	5,261.61	9.01	9.52	9.42	**Viet Nam**
-	-	48.93	14.21	15.57	15.43	**Western Sahara**
-	120	639.30	5.86	7.46	7.35	**Yemen**
0.8	125	559.90	9.79	11.03	10.92	**Zambia**
-	56	351.52	5.70	5.46	5.47	**Zimbabwe**
	1,274	**280,353.53**	**6.36**	**6.47**		**WORLD**

Country details table:

COUNTRY/ TERRITORY	IDF REGION	Number of people with diabetes (20-79) in 1000s, Men	Number of people with diabetes (20-79) in 1000s, Women	Number of people with diabetes (20-79) in 1000s, Rural Setting	Number of people with diabetes (20-79) in 1000s, Urban Setting
Afghanistan	**MENA**	427.39	390.91	584.30	234.00
Albania	**EUR**	31.31	32.80	26.07	38.04
Algeria	**MENA**	704.40	730.73	339.94	1,095.18
Andorra	**EUR**	2.49	2.27	0.50	4.26
Angola	**AFR**	88.92	96.43	47.28	138.06
Anguilla	**NAC**	0.57	0.35	-	0.93
Antigua and Barbuda	**NAC**	3.31	3.94	5.14	2.10
Argentina	**SACA**	719.10	812.69	83.12	1,448.67
Armenia	**MENA**	83.37	108.28	57.61	134.04
Aruba	**NAC**	5.07	6.63	6.45	5.25
Australia	**WP**	720.35	571.74	137.28	1,154.81
Austria	**EUR**	277.46	293.53	165.94	405.05
Azerbaijan	**EUR**	74.67	92.46	69.29	97.85
Bahamas	**NAC**	13.29	15.49	4.79	23.99
Bahrain	**MENA**	91.42	59.38	7.91	142.88
Bangladesh	**SEA**	4,098.35	4,307.27	2,918.99	5,486.62
Barbados	**NAC**	12.25	16.86	15.98	13.13
Belarus	**EUR**	293.25	383.38	144.74	531.89
Belgium	**EUR**	259.85	255.04	11.41	503.49
Belize	**NAC**	7.70	16.76	10.86	13.60
Benin	**AFR**	33.70	36.93	24.94	45.70
Bermuda	**NAC**	3.13	3.36	-	6.49
Bhutan	**SEA**	12.29	9.18	10.31	11.17
Bolivia (Plurinational State of)	**SACA**	139.60	163.68	78.90	224.38
Bosnia and Herzegovina	**EUR**	125.85	139.01	122.20	142.67
Botswana	**AFR**	30.79	63.10	22.13	71.75
Brazil	**SACA**	4,473.84	7,966.13	1,207.66	11,232.31

estimates for 2011

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
251.18	397.31	169.81	409.15	**Afghanistan**
10.39	26.00	27.73	23.00	**Albania**
585.18	587.71	262.24	883.60	**Algeria**
0.23	1.70	2.83	1.74	**Andorra**
37.03	112.08	36.23	148.27	**Angola**
0.16	0.46	0.31	0.38	**Anguilla**
0.94	3.48	2.82	2.01	**Antigua and Barbuda**
121.62	781.13	629.05	684.18	**Argentina**
31.71	104.86	55.08	118.00	**Armenia**
1.06	6.23	4.41	3.24	**Aruba**
109.37	493.47	689.25	603.54	**Australia**
32.52	174.00	364.47	208.92	**Austria**
32.24	82.55	52.35	59.96	**Azerbaijan**
4.40	14.68	9.70	7.98	**Bahamas**
47.87	86.57	16.36	61.37	**Bahrain**
3,167.80	3,888.62	1,349.20	4,039.74	**Bangladesh**
2.24	14.79	12.08	8.07	**Barbados**
64.92	321.03	290.68	242.74	**Belarus**
29.51	177.10	308.29	188.40	**Belgium**
7.92	11.21	5.32	10.08	**Belize**
28.27	30.02	12.35	55.05	**Benin**
0.71	2.97	2.81	1.80	**Bermuda**
6.51	9.73	5.24	10.97	**Bhutan**
45.13	153.09	105.05	135.46	**Bolivia (Plurinational State of)**
23.43	120.92	120.52	95.02	**Bosnia and Herzegovina**
11.65	45.86	36.38	75.11	**Botswana**
1,612.26	6,061.00	4,766.70	5,556.31	**Brazil**

Country details table: estimates for 2011

COUNTRY/ TERRITORY	IDF REGION	Number of people with diabetes (20-79) in 1000s, Men	Number of people with diabetes (20-79) in 1000s, Women	Number of people with diabetes (20-79) in 1000s, Rural Setting	Number of people with diabetes (20-79) in 1000s, Urban Setting
British Virgin Islands	**NAC**	0.80	0.50	0.72	0.57
Brunei Darussalam	**WP**	11.10	8.16	4.58	14.68
Bulgaria	**EUR**	294.26	237.29	123.67	407.88
Burkina Faso	**AFR**	86.63	88.51	113.18	61.96
Burundi	**AFR**	50.67	43.55	65.68	28.54
Cambodia	**WP**	90.26	109.11	126.52	72.86
Cameroon	**AFR**	252.80	248.65	128.59	372.85
Canada	**NAC**	1,479.74	1,236.40	524.37	2,191.76
Cape Verde	**AFR**	6.44	6.70	1.58	11.55
Cayman Islands	**NAC**	2.12	2.26	-	4.38
Central African Republic	**AFR**	28.53	29.63	29.60	28.55
Chad	**AFR**	93.81	103.25	99.90	97.15
Channel Islands	**EUR**	4.30	3.65	5.08	2.87
Chile	**SACA**	528.08	661.97	94.36	1,095.70
China	**WP**	50,293.26	39,751.83	39,921.31	50,123.78
China, Hong Kong SAR	**WP**	241.02	284.37	-	525.39
China, Macao SAR	**WP**	15.15	17.56	-	32.71
Colombia	**SACA**	931.10	1,678.19	493.84	2,115.45
Comoros	**AFR**	11.57	11.91	11.86	11.62
Congo	**AFR**	47.77	46.84	10.96	83.65
Cook Islands	**WP**	0.55	0.41	0.23	0.73
Costa Rica	**SACA**	134.41	136.80	75.49	195.72
Côte d'Ivoire	**AFR**	220.86	185.63	70.19	336.30
Croatia	**EUR**	106.12	112.71	80.42	138.42
Cuba	**SACA**	437.06	501.98	179.07	759.98
Cyprus	**EUR**	56.53	25.31	21.68	60.16

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
0.22	0.65	0.43	0.53	**British Virgin Islands**
1.84	11.17	6.25	9.00	**Brunei Darussalam**
23.95	187.91	319.69	190.69	**Bulgaria**
66.01	75.20	33.92	136.50	**Burkina Faso**
33.05	44.42	16.76	73.43	**Burundi**
41.31	109.77	48.29	125.69	**Cambodia**
181.62	221.91	97.91	401.16	**Cameroon**
163.86	1,118.32	1,433.95	752.64	**Canada**
4.05	6.71	2.38	10.51	**Cape Verde**
0.67	2.06	1.65	1.21	**Cayman Islands**
18.36	25.19	14.60	45.33	**Central African Republic**
128.13	53.25	15.67	153.58	**Chad**
0.39	2.93	4.63	2.91	**Channel Islands**
126.56	600.38	463.12	531.54	**Chile**
13,577.65	45,066.15	31,401.30	51,217.65	**China**
38.75	269.41	217.23	245.41	**China, Hong Kong SAR**
3.29	18.84	10.58	15.28	**China, Macao SAR**
348.95	1,320.20	940.14	1,165.44	**Colombia**
5.06	13.84	4.58	18.30	**Comoros**
32.33	43.74	18.54	75.69	**Congo**
0.17	0.45	0.35	0.45	**Cook Islands**
17.35	134.59	119.28	121.14	**Costa Rica**
126.04	188.35	92.11	325.20	**Côte d'Ivoire**
20.83	93.51	104.50	80.07	**Croatia**
48.15	411.13	479.77	419.42	**Cuba**
10.81	37.61	33.42	29.94	**Cyprus**

Country details table: estimates for 2011

COUNTRY/ TERRITORY	IDF REGION	Number of people with diabetes (20-79) in 1000s, Men	Number of people with diabetes (20-79) in 1000s, Women	Number of people with diabetes (20-79) in 1000s, Rural Setting	Number of people with diabetes (20-79) in 1000s, Urban Setting
Czech Republic	**EUR**	288.41	268.98	126.64	430.75
Dem. People's Republic of Korea	**WP**	665.84	841.66	372.45	1,135.05
Democratic Republic of the Congo	**AFR**	367.52	363.22	398.79	331.95
Denmark	**EUR**	159.78	139.69	34.02	265.45
Djibouti	**AFR**	13.04	13.02	1.68	24.38
Dominica	**NAC**	2.38	1.48	1.16	2.70
Dominican Republic	**SACA**	214.04	217.60	101.83	329.81
Ecuador	**SACA**	247.30	276.88	133.81	390.38
Egypt	**MENA**	3,123.78	4,199.59	3,300.80	4,022.57
El Salvador	**SACA**	125.57	167.50	81.86	211.21
Equatorial Guinea	**AFR**	7.47	6.57	3.65	10.38
Eritrea	**AFR**	43.26	52.23	56.07	39.42
Estonia	**EUR**	45.11	45.60	24.86	65.85
Ethiopia	**AFR**	660.36	716.92	916.67	460.62
Fiji	**WP**	25.87	29.50	23.91	31.46
Finland	**EUR**	195.47	144.85	43.86	296.47
France	**EUR**	1,733.89	1,503.70	313.52	2,924.07
French Guiana	**SACA**	4.71	7.30	2.16	9.85
French Polynesia	**WP**	8.69	6.23	7.21	7.72
Gabon	**AFR**	27.15	41.45	5.00	63.60
Gambia	**AFR**	6.75	5.53	3.61	8.68
Georgia	**EUR**	46.49	58.15	42.59	62.06
Germany	**EUR**	2,674.26	2,347.97	1,168.38	3,853.85
Ghana	**AFR**	259.02	258.42	139.55	377.88
Greece	**EUR**	273.77	329.59	216.17	387.19
Grenada	**NAC**	3.02	1.81	2.77	2.05

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
30.89	202.33	324.18	203.95	**Czech Republic**
197.62	836.61	473.27	950.33	**Dem. People's Republic of Korea**
249.46	324.19	157.10	569.54	**Democratic Republic of the Congo**
22.07	109.40	168.01	109.58	**Denmark**
8.84	12.43	4.78	20.84	**Djibouti**
0.66	1.92	1.27	1.59	**Dominica**
53.97	204.29	173.38	192.79	**Dominican Republic**
71.98	268.75	183.45	234.13	**Ecuador**
1,688.40	3,610.35	2,024.62	4,509.00	**Egypt**
51.07	143.93	98.07	130.90	**El Salvador**
3.40	8.60	2.03	11.23	**Equatorial Guinea**
69.07	20.66	5.76	74.43	**Eritrea**
8.44	31.52	50.76	33.19	**Estonia**
874.82	382.88	119.58	1,073.45	**Ethiopia**
8.24	32.36	14.76	31.49	**Fiji**
9.25	109.77	221.30	124.52	**Finland**
118.38	1,303.38	1,815.83	1,184.63	**France**
1.63	6.54	3.85	5.37	**French Guiana**
2.52	7.15	5.26	6.97	**French Polynesia**
11.57	33.84	23.18	54.88	**Gabon**
3.61	7.24	1.43	9.58	**Gambia**
13.39	41.01	50.25	37.54	**Georgia**
176.46	1,661.72	3,184.06	1,837.63	**Germany**
107.37	267.58	142.48	403.29	**Ghana**
36.94	196.22	370.19	220.77	**Greece**
1.07	2.33	1.43	1.99	**Grenada**

Country details table: estimates for 2011

COUNTRY/ TERRITORY	IDF REGION	Number of people with diabetes (20-79) in 1000s, Men	Number of people with diabetes (20-79) in 1000s, Women	Number of people with diabetes (20-79) in 1000s, Rural Setting	Number of people with diabetes (20-79) in 1000s, Urban Setting
Guadeloupe	**NAC**	9.85	14.06	0.34	23.58
Guam	**WP**	5.89	4.43	0.70	9.62
Guatemala	**SACA**	253.83	279.43	222.49	310.77
Guinea	**AFR**	100.96	80.83	112.06	69.73
Guinea-Bissau	**AFR**	9.73	9.40	11.57	7.56
Guyana	**NAC**	20.17	45.43	45.12	20.47
Haiti	**NAC**	111.10	184.36	118.25	177.21
Honduras	**SACA**	113.33	103.53	85.76	131.11
Hungary	**EUR**	344.11	224.27	190.26	378.13
Iceland	**EUR**	5.66	2.95	0.49	8.13
India	**SEA**	32,498.07	28,760.36	33,709.98	27,548.45
Indonesia	**WP**	3,043.27	4,248.64	3,429.61	3,862.31
Iran (Islamic Republic of)	**MENA**	2,351.30	2,343.67	951.90	3,743.07
Iraq	**MENA**	459.09	629.92	266.89	822.12
Ireland	**EUR**	104.27	87.11	63.81	127.56
Israel	**EUR**	206.27	194.04	28.30	372.01
Italy	**EUR**	1,734.89	1,825.51	1,008.95	2,551.44
Jamaica	**NAC**	125.54	132.94	116.32	142.16
Japan	**WP**	4,869.41	5,804.92	3,942.41	6,731.91
Jordan	**MENA**	148.87	142.70	71.31	220.27
Kazakhstan	**EUR**	364.36	436.82	290.86	510.32
Kenya	**AFR**	436.92	332.36	447.00	322.29
Kiribati	**WP**	7.99	7.03	7.15	7.88
Kuwait	**MENA**	175.34	122.65	2.08	295.92
Kyrgyzstan	**EUR**	113.89	40.35	93.30	60.94
Lao People's Democratic Republic	**WP**	43.37	46.72	41.44	48.64
Latvia	**EUR**	71.11	95.15	47.29	118.97
Lebanon	**MENA**	230.97	296.97	44.24	483.70
Lesotho	**AFR**	13.44	15.70	10.41	18.72
Liberia	**AFR**	24.93	26.09	21.27	29.74

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
1.96	12.28	9.68	9.86	**Guadeloupe**
1.50	4.81	4.01	4.82	**Guam**
125.02	242.83	165.40	238.18	**Guatemala**
76.33	65.26	40.21	141.69	**Guinea**
6.42	8.29	4.42	14.91	**Guinea-Bissau**
17.98	32.04	15.58	27.04	**Guyana**
56.38	147.46	91.62	86.87	**Haiti**
42.98	122.58	51.30	96.86	**Honduras**
46.69	256.27	265.42	207.97	**Hungary**
0.44	3.22	4.95	3.15	**Iceland**
12,530.58	34,606.64	14,121.21	31,287.74	**India**
1,473.84	3,866.45	1,951.63	4,147.64	**Indonesia**
1,337.18	2,271.88	1,085.92	2,890.69	**Iran (Islamic Republic of)**
324.86	485.23	278.93	670.50	**Iraq**
13.35	74.51	103.52	70.02	**Ireland**
18.72	146.76	234.83	146.47	**Israel**
82.01	1,026.14	2,452.24	1,302.75	**Italy**
61.04	128.40	69.04	106.54	**Jamaica**
631.43	3,554.13	6,488.77	4,985.98	**Japan**
56.10	141.86	93.61	179.52	**Jordan**
108.55	414.32	278.32	287.42	**Kazakhstan**
252.56	384.57	132.15	599.58	**Kenya**
3.51	8.02	3.50	8.54	**Kiribati**
99.90	155.87	42.22	121.28	**Kuwait**
7.34	93.38	53.52	45.25	**Kyrgyzstan**
21.21	47.23	21.65	56.79	**Lao People's Democratic Republic**
14.46	69.34	82.45	59.64	**Latvia**
57.26	247.83	222.86	325.05	**Lebanon**
9.52	12.84	6.78	23.31	**Lesotho**
16.62	24.00	10.40	39.76	**Liberia**

Country details table: estimates for 2011

COUNTRY/ TERRITORY	IDF REGION	Number of people with diabetes (20-79) in 1000s, Men	Number of people with diabetes (20-79) in 1000s, Women	Number of people with diabetes (20-79) in 1000s, Rural Setting	Number of people with diabetes (20-79) in 1000s, Urban Setting
Libyan Arab Jamahiriya	**MENA**	211.27	225.11	65.80	370.58
Liechtenstein	**EUR**	0.96	0.82	1.48	0.30
Lithuania	**EUR**	101.93	133.95	68.31	167.58
Luxembourg	**EUR**	12.02	9.08	2.71	18.39
Madagascar	**AFR**	202.45	225.56	281.80	146.21
Malawi	**AFR**	210.44	141.82	215.94	136.32
Malaysia	**WP**	1,040.66	989.22	424.85	1,605.03
Maldives	**SEA**	8.13	7.07	6.46	8.74
Mali	**AFR**	46.56	53.27	41.01	58.82
Malta	**EUR**	12.54	17.56	1.35	28.76
Marshall Islands	**WP**	3.57	3.45	1.15	5.87
Martinique	**NAC**	19.15	23.80	5.10	37.85
Mauritania	**AFR**	29.17	31.41	21.83	38.75
Mauritius	**SEA**	68.38	69.80	66.77	71.41
Mexico	**NAC**	5,457.01	4,836.67	1,560.20	8,733.48
Micronesia (Fed. States of)	**WP**	3.87	3.88	4.87	2.88
Monaco	**EUR**	1.09	0.97	-	2.06
Mongolia	**WP**	76.86	40.61	35.20	82.26
Montenegro	**EUR**	20.10	21.83	14.36	27.57
Morocco	**MENA**	608.75	659.12	389.14	878.74
Mozambique	**AFR**	134.64	160.07	90.15	204.57
Myanmar	**WP**	857.93	1,245.74	1,044.76	1,058.91
Namibia	**AFR**	27.20	46.91	32.84	41.27
Nauru	**WP**	0.59	0.64	-	1.23
Nepal	**SEA**	264.50	223.70	186.89	301.31
Netherlands	**EUR**	448.12	433.52	129.78	751.85
Netherlands Antilles	**NAC**	9.19	11.46	1.47	19.17
New Caledonia	**WP**	8.28	6.29	6.18	8.39

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
101.37	202.01	133.00	268.68	**Libyan Arab Jamahiriya**
0.09	0.63	1.07	0.65	**Liechtenstein**
20.47	103.29	112.12	84.62	**Lithuania**
0.85	8.67	11.59	7.72	**Luxembourg**
204.02	166.99	57.00	333.59	**Madagascar**
206.34	102.84	43.08	274.55	**Malawi**
468.50	1,086.56	474.82	1,154.60	**Malaysia**
4.45	7.51	3.23	7.76	**Maldives**
39.69	38.70	21.44	77.81	**Mali**
0.32	9.79	20.00	11.02	**Malta**
1.63	3.76	1.63	4.00	**Marshall Islands**
3.87	19.81	19.27	11.90	**Martinique**
21.76	23.82	15.01	47.22	**Mauritania**
19.91	75.43	42.85	70.58	**Mauritius**
2,140.50	5,489.36	2,663.82	4,243.06	**Mexico**
1.92	4.04	1.79	4.41	**Micronesia (Fed. States of)**
0.08	0.76	1.22	0.75	**Monaco**
51.26	55.59	10.62	66.81	**Mongolia**
3.95	18.96	19.02	15.04	**Montenegro**
278.15	674.75	314.98	780.63	**Morocco**
118.42	135.99	40.30	229.70	**Mozambique**
369.62	1,281.19	452.85	1,326.15	**Myanmar**
13.26	36.70	24.15	59.29	**Namibia**
0.31	0.64	0.28	0.70	**Nauru**
115.37	227.20	145.64	234.63	**Nepal**
45.64	288.31	547.68	322.59	**Netherlands**
2.41	10.37	7.86	5.72	**Netherlands Antilles**
2.35	6.38	5.85	6.81	**New Caledonia**

Country details table: estimates for 2011

COUNTRY/ TERRITORY	IDF REGION	Number of people with diabetes (20-79) in 1000s, Men	Number of people with diabetes (20-79) in 1000s, Women	Number of people with diabetes (20-79) in 1000s, Rural Setting	Number of people with diabetes (20-79) in 1000s, Urban Setting
New Zealand	**WP**	174.98	137.14	42.56	269.56
Nicaragua	**SACA**	129.89	152.92	97.36	185.45
Niger	**AFR**	164.39	119.46	187.12	96.73
Nigeria	**AFR**	1,550.24	1,504.27	539.93	2,514.58
Niue	**WP**	0.04	0.04	0.04	0.03
Norway	**EUR**	117.87	84.21	36.26	165.82
Occupied Palestinian Territory	**MENA**	51.83	72.66	32.14	92.35
Oman	**MENA**	88.06	50.34	24.08	114.31
Pakistan	**MENA**	3,258.59	3,090.64	3,619.97	2,729.26
Palau	**WP**	0.60	0.75	0.17	1.18
Panama	**SACA**	92.17	104.03	36.93	159.27
Papua New Guinea	**WP**	83.03	133.79	191.12	25.70
Paraguay	**SACA**	99.21	105.78	62.26	142.73
Peru	**SACA**	450.30	491.94	253.64	688.59
Philippines	**WP**	1,159.76	3,059.94	1,793.48	2,426.23
Poland	**EUR**	1,532.25	1,525.21	1,385.81	1,671.65
Portugal	**EUR**	587.18	434.18	359.98	661.38
Puerto Rico	**SACA**	163.77	224.71	4.15	384.33
Qatar	**MENA**	166.20	50.69	4.09	212.80
Republic of Korea	**WP**	1,714.35	1,472.03	529.03	2,657.36
Republic of Moldova	**EUR**	35.39	44.64	36.62	43.41
Réunion	**AFR**	43.01	49.63	2.74	89.90
Romania	**EUR**	706.98	799.31	566.59	939.71
Russian Federation	**EUR**	5,227.48	7,365.68	2,761.63	9,831.52
Rwanda	**AFR**	68.11	58.12	69.80	56.43
Saint Kitts and Nevis	**NAC**	1.79	1.11	1.88	1.02
Saint Lucia	**NAC**	5.28	3.37	6.00	2.64

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
35.01	128.86	148.25	145.79	**New Zealand**
55.43	152.10	75.29	126.32	**Nicaragua**
188.66	80.51	14.68	221.23	**Niger**
1,004.01	1,425.38	625.12	2,443.61	**Nigeria**
0.01	0.04	0.02	0.04	**Niue**
19.43	82.67	99.99	73.94	**Norway**
13.96	76.42	34.11	76.65	**Occupied Palestinian Territory**
50.39	65.05	22.96	56.33	**Oman**
1,708.62	3,111.81	1,528.79	3,909.22	**Pakistan**
0.12	0.85	0.38	0.77	**Palau**
15.50	90.92	89.78	87.63	**Panama**
49.32	117.47	50.03	123.33	**Papua New Guinea**
29.13	105.72	70.15	91.56	**Paraguay**
107.78	510.28	324.18	420.85	**Peru**
670.94	2,429.78	1,118.98	2,400.17	**Philippines**
438.89	1,309.90	1,308.67	1,096.86	**Poland**
78.30	372.61	570.46	373.72	**Portugal**
38.08	163.20	187.20	107.65	**Puerto Rico**
83.21	119.99	13.68	88.27	**Qatar**
319.28	1,591.92	1,275.18	1,488.36	**Republic of Korea**
11.31	34.15	34.56	28.71	**Republic of Moldova**
10.62	50.46	31.56	74.11	**Réunion**
148.86	639.46	717.97	540.38	**Romania**
876.65	6,022.06	5,694.44	4,517.79	**Russian Federation**
45.91	56.90	23.42	98.38	**Rwanda**
0.50	1.45	0.96	1.20	**Saint Kitts and Nevis**
1.81	4.41	2.43	3.56	**Saint Lucia**

Country details table: estimates for 2011

COUNTRY/ TERRITORY	IDF REGION	Number of people with diabetes (20-79) in 1000s, Men	Number of people with diabetes (20-79) in 1000s, Women	Number of people with diabetes (20-79) in 1000s, Rural Setting	Number of people with diabetes (20-79) in 1000s, Urban Setting
Saint Vincent and the Grenadines	**NAC**	3.73	2.11	2.76	3.08
Samoa	**WP**	2.98	3.57	4.61	1.94
San Marino	**EUR**	0.93	0.85	0.09	1.69
Sao Tome and Principe	**AFR**	1.74	1.86	0.40	3.20
Saudi Arabia	**MENA**	1,450.74	1,308.82	257.66	2,501.90
Senegal	**AFR**	71.20	75.28	69.12	77.37
Serbia	**EUR**	325.31	345.71	262.98	408.04
Seychelles	**AFR**	1.59	1.93	1.00	2.52
Sierra Leone	**AFR**	35.59	36.49	36.41	35.67
Singapore	**WP**	224.12	202.57	-	426.69
Slovakia	**EUR**	125.73	149.77	114.17	161.33
Slovenia	**EUR**	71.84	88.58	75.13	85.29
Solomon Islands	**WP**	19.97	14.50	25.99	8.49
Somalia	**AFR**	87.65	97.49	73.57	111.57
South Africa	**AFR**	936.79	1,009.85	453.87	1,492.76
Spain	**EUR**	1,621.95	1,218.16	417.10	2,423.01
Sri Lanka	**SEA**	562.33	517.46	778.78	301.01
Sudan	**MENA**	947.91	718.72	797.34	869.29
Suriname	**NAC**	17.81	10.74	7.93	20.62
Swaziland	**AFR**	6.53	7.37	6.15	7.75
Sweden	**EUR**	209.04	177.33	55.31	331.06
Switzerland	**EUR**	205.10	218.68	99.61	324.17
Syrian Arab Republic	**MENA**	437.18	452.34	366.52	523.00
Taiwan	**WP**	815.67	848.87	1,248.26	416.28
Tajikistan	**EUR**	115.67	39.79	107.99	47.47
TFYR Macedonia	**EUR**	66.87	68.06	48.75	86.18
Thailand	**WP**	1,777.78	2,236.55	2,472.53	1,541.81
Timor-Leste	**WP**	12.04	17.95	21.80	8.18

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
1.12	3.08	1.65	2.41	**Saint Vincent and the Grenadines**
0.62	3.55	2.39	3.73	**Samoa**
0.08	0.64	1.05	0.65	**San Marino**
1.33	1.61	0.67	2.88	**Sao Tome and Principe**
862.36	1,474.91	422.29	1,123.14	**Saudi Arabia**
51.70	65.83	28.96	114.17	**Senegal**
62.67	292.17	316.17	240.73	**Serbia**
0.58	1.77	1.17	2.82	**Seychelles**
24.15	35.50	12.42	56.17	**Sierra Leone**
19.32	214.04	193.33	199.31	**Singapore**
27.64	118.37	129.49	100.80	**Slovakia**
7.14	61.30	91.98	58.70	**Slovenia**
9.83	17.26	7.39	19.61	**Solomon Islands**
116.79	54.44	13.90	144.30	**Somalia**
585.35	1,032.68	328.61	1,557.31	**South Africa**
147.02	1,045.68	1,647.41	1,039.20	**Spain**
234.74	528.89	316.16	551.50	**Sri Lanka**
570.37	804.00	292.26	1,026.14	**Sudan**
5.52	14.92	8.11	11.77	**Suriname**
4.05	6.86	2.99	11.12	**Swaziland**
25.03	141.30	220.04	141.37	**Sweden**
48.18	156.44	219.16	155.06	**Switzerland**
112.42	521.57	255.52	547.67	**Syrian Arab Republic**
113.38	740.68	810.49	777.50	**Taiwan**
7.07	91.00	57.38	45.61	**Tajikistan**
13.89	61.82	59.22	48.41	**TFYR Macedonia**
549.23	2,213.12	1,251.98	2,283.35	**Thailand**
5.81	15.76	8.42	17.05	**Timor-Leste**

Country details table: estimates for 2011

COUNTRY/ TERRITORY	IDF REGION	Number of people with diabetes (20-79) in 1000s, Men	Number of people with diabetes (20-79) in 1000s, Women	Number of people with diabetes (20-79) in 1000s, Rural Setting	Number of people with diabetes (20-79) in 1000s, Urban Setting
Togo	**AFR**	39.91	41.25	37.16	44.00
Tokelau	**WP**	0.03	0.04	-	0.07
Tonga	**WP**	2.52	3.62	4.28	1.85
Trinidad and Tobago	**NAC**	49.93	67.59	101.75	15.77
Tunisia	**MENA**	278.32	351.26	113.22	516.36
Turkey	**EUR**	1,469.20	2,033.07	805.42	2,696.85
Turkmenistan	**EUR**	30.65	39.12	30.36	39.42
Tuvalu	**WP**	0.54	0.52	0.35	0.71
Uganda	**AFR**	170.39	137.52	201.19	106.72
Ukraine	**EUR**	501.50	694.48	306.58	889.40
United Arab Emirates	**MENA**	567.86	200.12	74.27	693.72
United Kingdom	**EUR**	1,790.07	1,273.84	549.28	2,514.64
United Republic of Tanzania	**AFR**	255.78	217.11	144.68	328.21
United States of America	**NAC**	11,986.27	11,735.50	4,134.00	19,587.76
United States Virgin Islands	**NAC**	5.45	6.37	0.54	11.28
Uruguay	**SACA**	68.25	80.36	13.59	135.02
Uzbekistan	**EUR**	611.49	201.44	478.70	334.23
Vanuatu	**WP**	8.78	8.49	10.10	7.16
Venezuela (Bolivarian Republic of)	**SACA**	630.58	1,043.98	78.19	1,596.37
Viet Nam	**WP**	808.74	893.99	847.48	855.25
Western Sahara	**AFR**	11.05	10.39	1.74	19.70
Yemen	**MENA**	366.00	361.10	477.85	249.24
Zambia	**AFR**	116.72	127.04	148.45	95.31
Zimbabwe	**AFR**	249.50	301.36	214.35	336.50
WORLD		**185,112.91**	**181,156.21**	**135,116.32**	**231,152.80**

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
26.20	36.85	18.11	63.25	**Togo**
0.01	0.04	0.02	0.04	**Tokelau**
1.36	3.08	1.69	3.49	**Tonga**
16.05	60.27	41.21	32.57	**Trinidad and Tobago**
107.02	339.91	182.66	387.63	**Tunisia**
430.62	1,837.97	1,233.68	1,256.44	**Turkey**
17.84	32.66	19.28	25.03	**Turkmenistan**
0.25	0.55	0.26	0.60	**Tuvalu**
114.69	134.18	59.04	239.99	**Uganda**
155.44	459.63	580.91	429.06	**Ukraine**
318.11	416.30	33.58	312.57	**United Arab Emirates**
212.97	1,088.84	1,762.11	1,121.09	**United Kingdom**
173.58	198.46	100.84	368.57	**United Republic of Tanzania**
3,306.67	10,665.64	9,749.46	6,573.30	**United States of America**
1.04	4.99	5.78	3.27	**United States Virgin Islands**
10.34	73.28	64.99	66.38	**Uruguay**
41.23	490.16	281.54	238.52	**Uzbekistan**
4.78	8.78	3.70	9.82	**Vanuatu**
230.36	821.76	622.44	747.94	**Venezuela (Bolivarian Republic of)**
337.03	971.14	394.56	1,073.40	**Viet Nam**
12.96	7.27	1.21	16.71	**Western Sahara**
137.64	373.92	215.54	447.67	**Yemen**
127.96	78.66	37.13	189.98	**Zambia**
322.49	136.73	91.63	429.34	**Zimbabwe**
62,554.75	**179,032.28**	**124,682.09**	**182,568.85**	**WORLD**

Abbreviations and acronyms

A

AFR
Africa

C

CVD
cardiovascular disease

D

DALY
Disability Adjusted Life years

DECS
IDF Consultative Section on Diabetes Education

DiaMond
Diabetes Mondiale study

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

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

T

TB
tuberculosis

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 healthcare 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
standard population
In order to generate estimates that are comparable from one country to another (see comparative prevalence), a standard population which assumes the same distribution of population in different ages is used.

Two standard populations were used to generate comparative estimates. One is based on the current WHO standard population derived using estimates from the UN Population Division 1998 estimates. This is the comparative estimate presented throughout the *IDF Diabetes Atlas* and is consistent with recent publications from

the Global Burden of Disease project which estimate the prevalence and time trends of several non-communicable diseases.

The second standard population is the most recent population estimates from the United Nations Population Division 2010 Revision for 2011. This population is used to model the national estimates, including the number of people with diabetes in 2011. Comparative estimates have also been calculated using this population and are presented in the summary table in Appendices.

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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Additional tables and figures are available at www.idf.org/diabetesatlas

Notes

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