

## DIABETES

### **A chronic, debilitating and often deadly disease**

- Diabetes is a chronic condition that arises when the pancreas does not produce enough insulin, or when the body cannot effectively use the insulin produced.
- Insulin is a hormone made by the pancreas that helps 'sugar' (glucose) to leave the blood and enter the cells of the body to be used as 'fuel'. When a person has diabetes, either their pancreas does not produce the insulin they need (type 1 diabetes) or their body cannot make effective use of the insulin they produce (type 2 diabetes).
- Diabetes is the fourth leading cause of death in most developed countries.
- Each year, over three million deaths worldwide are attributable to diabetes-related causes.

### **A global epidemic**

- Diabetes is reaching epidemic proportions. In 2003, the International Diabetes Federation estimated that almost 200 million people around the world had diabetes. By 2025 this figure is expected to rise to 333 million, amounting to 6.3% of the world's population living with diabetes.
- The prevalence of type 2 diabetes is rising at an alarming rate throughout the world, due to increases in life expectancy, obesity and sedentary lifestyles. Of particular cause for concern is the dramatic rise of type 2 diabetes in children and adolescents.
- Examples of the dramatic rise in diabetes prevalence can be found in India and China. India is host to the largest diabetes population in the world with an estimated 35 million people, amounting to 8% of the adult population. In China, where 2.7% of the adult population is affected by type 2 diabetes, the number of people with this condition is likely to exceed 50 million within the next 25 years.

### **Diabetes in Europe**

- IDF estimates that there are currently approximately 25 million people with diabetes in the 25 member states of the European Union. Estimates for the region for 2025 are likely to increase and reach nearly 30 million.
- There is a dramatic rise in both types of diabetes, especially among young people.
- It is estimated that Germany has by far the highest number of people with diabetes, with approximately 6, 3 million people affected. Germany is followed by Spain (3, 0 million), Italy (2, 88 million), France (2, 66 million) and Poland (2, 51 million). The number of people with diabetes in these 5 countries alone reaches approximately 17.3 million. This amounts to 69.2 % of the entire population affected in the EU.
- The European Union allocates around € 100 million/year for research on diabetes. This includes national funding agencies budgets, EU contributions, and non-profit organisations funds. The budget imbalance between the EU and the USA is striking: the USA spends approximately \$ 1 billion/year. (*EURADIA*).

### There are two main types of diabetes:

- Type 1 diabetes is an autoimmune disease that prevents the body from producing insulin. Type 1 diabetes occurs most often in children and young adults. Approximately 5 to 10 per cent of people with diabetes have type 1.
- Type 2 diabetes is a metabolic disorder that results from a combination of the body's inability to make effective use of the insulin produced, and steadily worsening production of insulin to overcome that defect. Genetics, obesity, and lack of appropriate diet and physical activity are factors that appear to play a role in the development of type 2 diabetes. Type 2 diabetes occurs most often in adults over the age of 40 and accounts for up to 95 percent of all diabetes cases. However, as a consequence of increased obesity and inactivity among the young, type 2 diabetes is now affecting children and young adults.

### Treatment of diabetes

The management of type 2 diabetes focuses on keeping blood glucose, blood pressure and blood fats levels at near-normal levels.

- Treatment of type 1 diabetes typically includes a carefully calculated diet, physical activity, blood glucose testing and daily insulin injections.
- Treatment of type 2 diabetes typically includes appropriate diet, exercise, home glucose testing, oral medication and/or insulin.

### Symptoms of uncontrolled diabetes:

Common symptoms of type 1 diabetes include:

- excessive thirst
- frequent urination
- sudden weight loss
- extreme tiredness
- blurred vision

People with type 2 diabetes may have the same symptoms but they may be less apparent.

- Many have no symptoms and are only diagnosed after several years with the condition.
- Almost 50% of people with type 2 diabetes are not aware that they have the condition.

### Complications of diabetes

Without proper insulin production and action, sugar remains in the blood, leading to chronic hyperglycaemia (raised blood glucose levels). This can result in short and long-term complications, many of which, if not prevented and left untreated, can be fatal. All have the potential to reduce the quality of life of people with diabetes and their families.

The most common long-term complications are:

- **Cardiovascular disease** - affects the heart and blood vessels and may cause fatal complications such as coronary heart disease (leading to a heart attack) and stroke (a common cause of disability and death in people with diabetes). People with diabetes are

two to four times more likely to develop cardiovascular disease than people without diabetes.

- **Diabetic neuropathy** (nerve disease) - damage to the nerve fibres primarily affecting the legs and feet. Foot ulcers are common symptoms. Infections in these wounds may ultimately result in amputation of the foot and lower leg. It is estimated that up to 70% of all lower limb amputations are related to diabetes.
- **Diabetic nephropathy** (kidney disease) - may result in total kidney failure and in the need for dialysis or kidney transplant. Diabetes is the leading cause of kidney failure in the developed world and accounts for approximately 35 to 40 % of new cases of End Stage Renal Disease (ESRD) each year.
- **Diabetic retinopathy** (eye disease) - damage to the retina of the eye which can lead to vision loss. The incidence of blindness is 25 times higher in people with diabetes than in the general population.

### Control and management of diabetes

The effective management of diabetes includes careful long-term monitoring and effective early treatment of diabetic complications. The risk of long-term diabetic complications can be greatly reduced by:

- Simple lifestyle changes (healthier diets, increased physical activity, not smoking)
- Good control of blood glucose levels, blood pressure and blood fats (including cholesterol and triglycerides)
- Appropriate healthcare
- Improved healthcare education for the general public, particularly those at risk of diabetes

Findings from the United Kingdom Prospective Diabetes Study (UKPDS), a landmark 20-year study of treatment for people with type 2 diabetes, demonstrate that maintaining blood glucose as close to normal as possible can significantly reduce the risk of diabetic microvascular complications. The study found that people with diabetes on drug therapy to control blood glucose experienced a 21 per cent decrease in eye disease and a 33 percent decrease in kidney problems.

### Costs of diabetes

As the world diabetes epidemic progresses, government, diabetes associations health professionals and people with diabetes themselves need to be aware of the current and future economic impact of the disease on the healthcare sector, the individual and family, and society.

- The total cost of caring for people with diabetes in the European Union is estimated between 28 billion and 53 billion Euros per year.
- The estimated costs of diabetes care per year in countries such as Belgium, France, Germany, Italy, Poland and the United Kingdom are given in the following table:

Selected year: 2003

Country	Per capita health expenditure (international dollars)	Cost of diabetes care per year ('000 international dollars) given values for R of - R=2	Cost of diabetes care per year ('000 international dollars) given values for R of - R=3
Belgium	2,269	686,248.6	1,319,504.9
France	2,335	5,832,389.7	11,017,934.3
Germany	2,754	7,030,622.9	13,504,262.2
Italy	2,04	5,513,866.1	10,388,485.7
Netherlands	2,255	939,828.2	1,814,885.1
Poland	578	1,329,141.0	2,455,541.3
United Kingdom	1,774	2,852,838.2	5,497,291.5
<b>Total</b>		<b>24,184,934.7</b>	<b>45,997,905.0</b>

*Diabetes Atlas second edition, International Diabetes Federation 2003*

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- Reducing the cost burden is possible by increasing the effectiveness of management and treatment for those who already have diabetes and by implementing primary prevention measures for those who are at high risk of developing type 2 diabetes.
- A large number of interventions such as blood glucose and blood pressure control, screening for and treatment of diabetic retinopathy and active care of the feet, for example, have proved to be cost-effective and even cost-saving.
- The cost of diabetes care refers to the cost element that is attributable to diabetes itself or to the complications of diabetes; it clearly includes the costs of hospital admissions and other healthcare episodes for diabetic ketoacidosis, hypoglycaemia and other direct results of diabetes or its therapy.
- The healthcare costs of diabetic neuropathy, retinopathy and nephropathy are also usually included. It is less clear, however, how much of the costs of care for such events as a myocardial infarction or stroke in a person with diabetes should be attributed to diabetes per se.

## DIABETES AND THE FOOT

Chronic hyperglycaemia (raised blood glucose levels) is usually associated with long-term damage to the body and the failure of various organs and tissues. People with diabetes are at risk of nerve damage (neuropathy) and problems with the blood supply to their feet (ischaemia). Nerve damage results in a reduced ability to feel pain, and injuries often go unnoticed. Ischaemia can slow down any wound healing. Both neuropathy and ischaemia can lead to foot ulcers. Infections in these wounds may ultimately result in amputation.

### A few facts and figures

- **People with diabetes are 25 times more likely to lose a leg than people without the condition.**
- **Throughout the world, up to 70% of all leg amputations happen to people with diabetes.**
- **Somewhere in the world a leg is lost to diabetes every thirty seconds**
- **It is estimated that up to 85% of all amputations due to diabetes can be prevented.**
- **85% of diabetes-related lower extremity amputations are preceded by a foot ulcer.**
- **Many foot ulcers can be prevented with suitable healthcare and informed self-care.**
- **In developed countries, one in every six people with diabetes will have an ulcer during their lifetime.**
- **In developing countries, foot problems related to diabetes are thought to be even more common.**
- **Foot problems account for up to 15% of healthcare resources in developed countries. In developing countries, it has been estimated that foot problems may account for as much as 40% of the total available resources.**

### Management of the diabetic foot

The ideal management for the prevention and treatment of diabetic foot problems includes:

- Regular inspection of the diabetic foot
- Identification of the foot at risk
- Education of people with diabetes and healthcare professionals
- Appropriate footwear
- Rapid treatment of all foot problems

### What are the warning signs?

It is important to know the warning signs in order to identify the foot at risk. These include:

- Swelling of the foot or ankle
- Very cold feet or legs

- Color changes red, blue or black discoloration
- Pain in legs at rest or while walking
- Open sores, no matter how small
- Non healing wounds
- In-growing toe nails
- Corns and calluses
- Lack of hair growth on the foot

### **The Eurodiale Consortium**

Clinical research in the field of the diabetic foot disease is an enormous challenge. Although much progress has been made in the last few decades, evidence for a number of important aspects of management is still lacking and most treatment is empirical. The difficulty to conduct good research is partly due to the variety of treatments and the fact that wounds may not heal for a variety of reasons. Another problem is that most foot clinics have too few patients to enable them to conduct sufficiently large clinical trials.

In 2000 a Pan-European research project was established aiming to improve diabetic foot care. The project involves 14 leading European diabetic foot clinics from 10 different countries and is collectively known as the Eurodiale Consortium. The essential project of the Consortium is a year-long study looking at the causes of ulcers and the ways that ulcers are managed in different parts of Europe. Currently more than 1200 people receiving diabetic foot care have been included

The project will also consider the variations in healthcare models and will examine them through site visits and structured interviews.

By looking at differences in aspects of treatment and outcomes, the Consortium will provide valuable insights into the needs of people with diabetic foot problems and how to best structure their care.

The Eurodiale Consortium has obtained funding from the European Union to conduct this research. The data already obtained can serve as a template for future clinical trials. The Eurodiale Consortium will be able to initiate, coordinate and perform randomized clinical trials on important aspects of diabetic foot disease.

### **References**

- *Diabetes Atlas* second version, International Diabetes Federation, 2003
- More information on diabetes and foot care can be found in the World Diabetes Day 2005 leaflet "*Diabetes and Foot Care – Put Feet First Prevent Amputations*".

## EXTRA INFORMATION:

The **International Diabetes Federation (IDF)** is the only global advocate for people with diabetes and their healthcare providers. The mission of IDF is to promote diabetes care, prevention and a cure worldwide. IDF is an umbrella organization of 185 member associations worldwide, representing millions of people with diabetes, their families, healthcare providers and specialists. IDF operates through a wide range of activities and tools, including education for people with diabetes, public awareness campaigns and the promotion of the free exchange of diabetes knowledge.

The **International Working Group on the Diabetic Foot (IWGDF)** is a worldwide organization whose initial goal was to establish an internationally accepted consensus on the diabetic foot. The *International Consensus on the Diabetic Foot* and the *Practical Guidelines on the management and the Prevention of the Diabetic Foot* were published in 1999. Since the launch the document has been translated and published in 25 languages. The IWGDF was acknowledged as an IDF Consultative Section in 2000.

For more information please contact

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### **International Working Group on the Diabetic Foot**

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