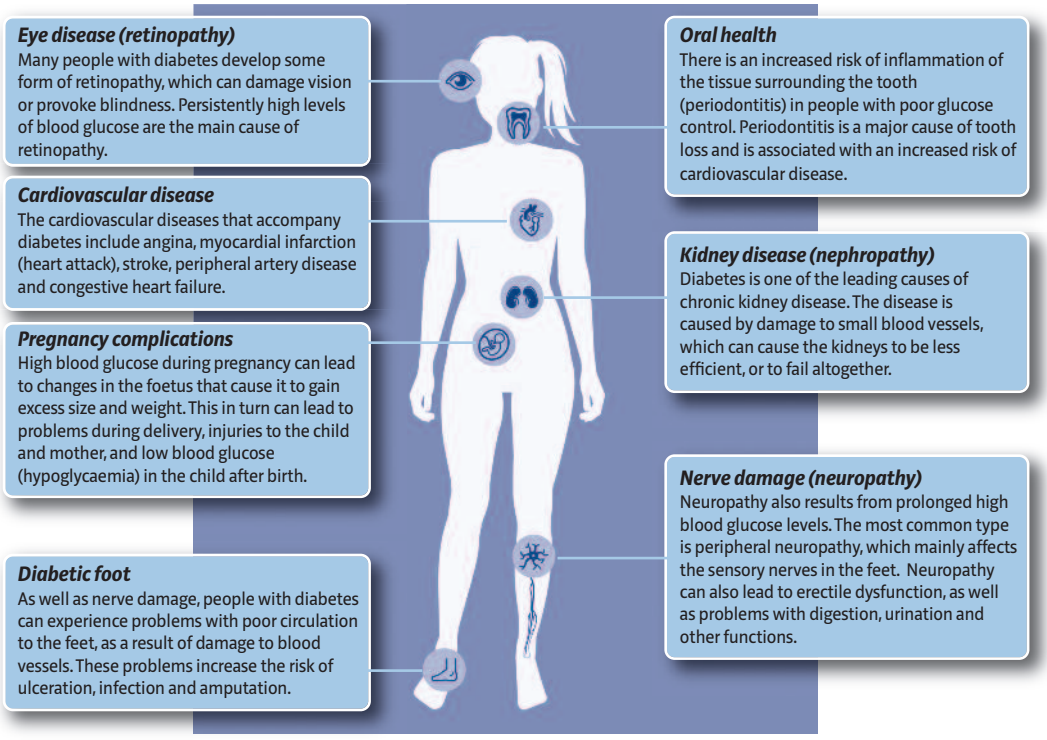
Window on the Science

Diabetes and diabetic kidney disease

Diabetes mellitus, commonly referred to as diabetes, is a chronic condition where the body does not produce enough of the insulin protein, or cannot effectively use the insulin it produces. Insulin is the hormone that regulates blood sugar (glucose). Consequently, uncontrolled diabetes can lead to having high levels of glucose in the blood. Over a period of time consistently high glucose levels can cause damage to blood vessels and organs in the body, leading to the many disabling and life-threatening conditions caused by diabetes.

The World Health Organisation (WHO) regards diabetes as one of the largest global health emergencies of the 21st century, with the number of people with diabetes growing rapidly worldwide. According to the International Diabetes Federation 415 million, or 1 in 11 adults, worldwide had diabetes in 2015.

It is further estimated that 1 in 2 adults with diabetes are undiagnosed. Since undiagnosed diabetics are less likely to monitor their blood glucose levels, they are at a higher risk of developing diabetes-related complications.



Diabetes complications

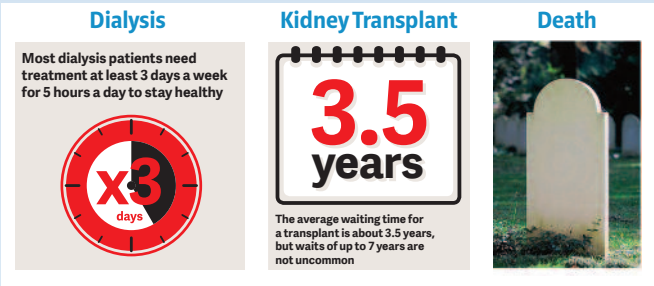
People with diabetes are at higher risk of developing a number of disabling and life-threatening health problems than people without diabetes. Consistently high blood glucose levels can lead to serious diseases affecting the heart and blood vessels, eyes, kidneys and nerves. People with diabetes are also at increased risk of developing infections. In almost all high income countries, diabetes is a leading cause of cardiovascular disease, blindness, kidney failure and lower-limb amputation. The growth in prevalence of type 2 diabetes in low- and middle-income countries means that without effective strategies to support better management of diabetes, it is likely that there will be large increases in the rates of these complications.

Diabetes complications can be prevented or delayed by maintaining blood glucose, blood pressure and cholesterol levels as close to normal as possible. Many complications can be picked up in their early stages by screening programmes that allow treatment to prevent them becoming more serious.

Diagram courtesy of IDF Diabetes Atlas Seventh Edition 2015

Pre-diabetes

Pre-diabetes is a condition where a person has blood glucose levels that are higher than normal, but not high enough to be diagnosed as diabetes. The higher than normal blood sugar levels can still cause complications. A person with pre-diabetes can often have unrecognised diabetic kidney disease.



Diabetic kidney disease

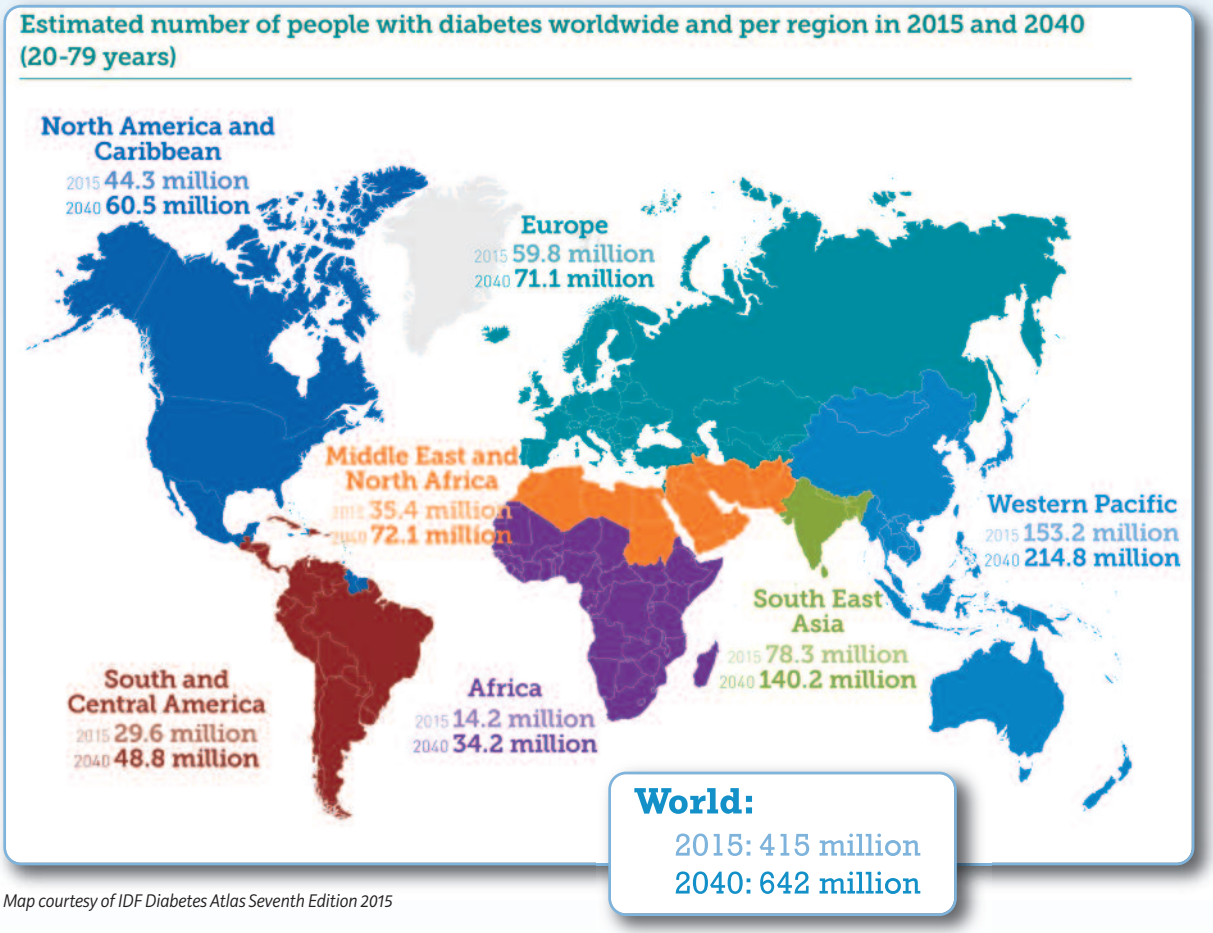
One of the major complications of diabetes is kidney damage. This is known as diabetic kidney disease (DKD) or chronic kidney disease (CKD). If the kidneys are damaged, then waste and fluids build up in the blood instead of leaving the body, leading to other health problems. In severe cases, diabetic kidney disease can lead to kidney failure. The only treatment options for kidney failure are dialysis or a kidney transplant.

The US Center for Disease Control states that 1 in 3 adult diabetics have chronic kidney disease, that's 138 million people. Once detected, chronic kidney disease can be treated through medication and lifestyle changes to slow down the disease progression, and to prevent or delay the onset of kidney failure. However, the only treatment options for kidney failure are dialysis or a kidney transplant.

Diagnosing diabetic kidney disease early is critical because it allows the patient to take steps to protect their kidneys from further damage. Current tests can only detect diabetic kidney disease after there has been kidney damage. There are no tests currently available to predict the clinical onset of diabetic kidney disease, with dialysis already costing more than $100,000 per person per year.

The International Diabetes Federation further predicts the number of diabetics will rise to 642 million by 2040, which, if unchecked, will increase the number of adults with chronic kidney disease by 76 million to 214 million. That's a potential new dialysis bill of $7.6 trillion per year.

PromarkerD can predict the clinical onset of diabetic kidney disease up to four years in advance.



Map courtesy of IDF Diabetes Atlas Seventh Edition 2015