

Understanding Diabetes Mellitus and the complications relating to the disease can assist the fitter to better serve patients.

Diabetes Mellitus and the Associated Complications

Dr.
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Total: 25.8 million people, or 8.3% of the population

Diagnosed: 18.8 million people

Undiagnosed: 7.0 million people

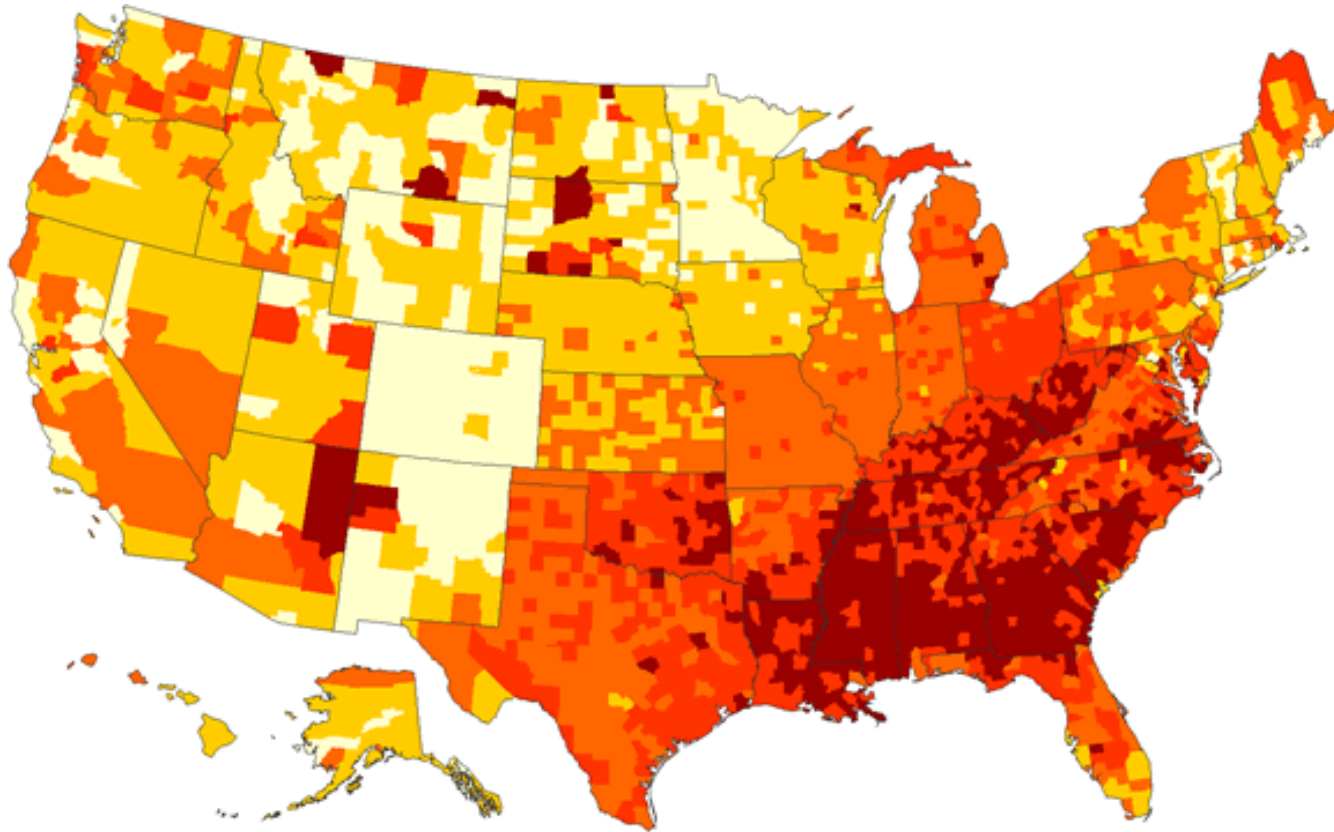
*Rates of diabetes have increased in all groups

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County Level Estimates of Diagnosed Diabetes — State Maps



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Most Costly Disease In the Modern World
\$174 Billion in Medical Expenses

5% of All Health Care Dollars Spent On **Unnecessary**
Diabetes Complications

Significantly Higher Average Annual Health Care Costs
\$13,243/Year – Diabetes Patients
\$2,560/Year – Non-diabetes Patients

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Comprehensive foot care programs can reduce diabetic foot amputations between 45-85%

Centers for Disease Control (CDC)

The leading cause of non-traumatic lower limb amputations in the United States is Diabetes.

Less than 20% of those who qualify for diabetic shoes are actually receiving them.

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**World Health
Organization**

According to the World Health Organization (WHO), the number of global cases of DM is expected to increase in the next 25 years from 135 million to nearly 300 million people.

Most of these people will come from areas of the world where unhealthy diets, aging, obesity, and sedentary lifestyles will contribute to the onset of Diabetes.

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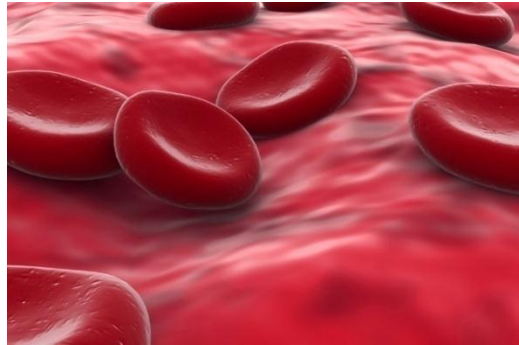


Diabetes is the decreased use of or shortage of insulin , which plays an active part in the metabolism of fat and proteins.

Sugar is glucose and used as fuel or an energy source for the body.

Insulin is a hormone. The pancreas secretes insulin to the blood. The liver stores glucose.

When not controlled, glucose and fats remain in the blood and damage vital organs.



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Normal blood 70-110 mg/dl (milligrams per deciliter)

Diabetic blood 126 mg/dl and higher

Pre-diabetic blood 111-125 mg/dl -high risk for acquiring diabetes (formerly “borderline diabetic”)

A₁C –glycated hemoglobin tests; reflects the average blood sugar level for the past 2-3 months; average for people without diabetes is 4-6% and diabetics generally like to keep it below 7%.

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Some general secondary pathologies
associated with diabetes include:

Heart disease

Stroke

Blindness

Kidney failure

Lower Extremity Amputations

Death related to flu and pneumonia

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Risk factors for prediabetes and type 2 diabetes

Researchers don't fully understand why some people develop prediabetes and type 2 diabetes and others don't. It's clear that certain factors increase the risk, however, including:

Weight. The more fatty tissue you have, the more resistant your cells become to insulin.

Inactivity. The less active you are, the greater your risk. Physical activity helps you control your weight, uses up glucose as energy and makes your cells more sensitive to insulin.

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Risk factors for prediabetes and type 2 diabetes (continued)

Family history. Your risk increases if a parent or sibling has type 2 diabetes.

Race. Although it's unclear why, people of certain races — including African Americans, Hispanics, American Indians and Asian Americans — are at higher risk.

Age. Your risk increases as you get older, especially after age 45. Often, that's because you tend to exercise less, lose muscle mass and gain weight as you age. But type 2 diabetes is increasing dramatically among children, adolescents and younger adults.

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Under Medicare Guidelines, having Diabetes does not alone qualify a beneficiary to receive footwear.

Proper documentation of one of 6 existing or past conditions determines eligibility for footwear to be covered under Medicare. (See Statement of Certifying Physician)

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Amputation:

The removal of a body extremity either by surgery or trauma. As a surgical measure, it is used to control pain or a disease process in the affected limb.

Lesser toe amputation



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**Amputations are not caused by any one specific problem.
Diabetes alone also does not ensure someone of any degree of
amputation.**

*Diabetes and
Peripheral neuropathy leads to
Loss of protective sensation and develops a
Wound or ulcer in conjunction with
Poor circulation and leads to the wound becoming
Infected and with a decreased ability to fight infection it becomes
Osteomyelitis—medical term for infection of the bone*

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Diabetes Duration:

The longer a person has had diabetes, the greater the risk of amputation.

Following a lower extremity amputation, a patient is at increased risk for both loss of the other limb and death. The rates for the occurrence of either mortality or loss of the second limb following an amputation are:

- o 1 year: 15%
- o 3 years: 38%
- o 5 years: 68%

The goal for diabetes health care providers must therefore be to help patients avoid the first amputation. Use of proper footwear and appropriate foot care techniques can help prevent many amputations.

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Ulcerations (mal perforans):

- A break or hole in the skin; open sores or wounds that most often occur on the bottom of the foot.
- Untreated ulcers can often become infected and may eventually lead to amputation.

More than 800,000 diabetic patients experience foot ulcers each year.



Ulcers (cont.):

Visiting a physician regularly for debridement and the use of custom orthoses and is the key to the management.



Most common sites are plantar to the met heads and hallux.

Risk factors for foot ulcers

- Previous amputation
- Past foot ulcer history
- Peripheral neuropathy
- Foot deformity
- Peripheral vascular disease
- Visual impairment
- Diabetic nephropathy (especially patients on dialysis)
- Poor glycemic control
- Cigarette smoking

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Diabetic Neuropathy:

A family of nerve disorders caused by diabetes.

➤ Peripheral neuropathy affects the extremity including the feet. Feet and legs are more likely to become affected before the hands and arms.

➤ Nerves not sending the proper messages to the brain.

➤ Symptoms include: numbness or insensitivity to pain or temperature; tingling or burning; sharp pains or cramps; extreme sensitivity to touch; loss of balance.

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Diabetic Neuropathy (cont.):

- Peripheral neuropathy can cause muscle weaknesses, which may lead to change in gait and foot deformities.
- Risk of occurrence: Roughly half the people with diabetes develop some type of neuropathy.

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Callus Formation (plantar keratoma):

- Hard areas of skin on the plantar surface of the foot.
- Caused by increased pressure.
- Very common occurrence even in non-diabetics.
- Usually painful with direct pressure.



Foot Deformity

Hammertoe: A toe that is bent at the proximal interphalangeal joint. A corn may develop at the bony prominence.

Very common, especially in diabetics due to weakened muscles at the tendons causing toes to curl under feet.



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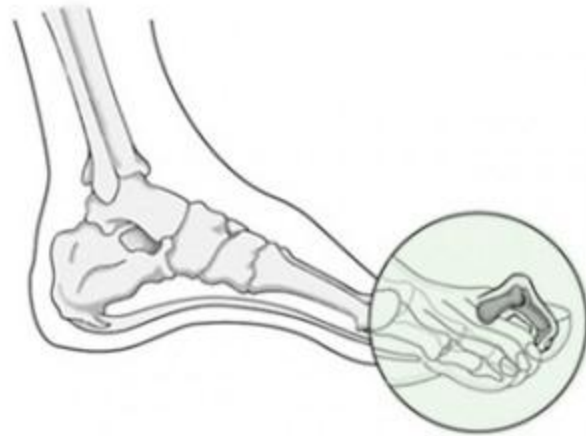


Foot Deformity

A mallet toe is bent at the distal interphalangeal (DIP) joint. A corn may develop at the dorsal bony prominence.



A claw toe is bent (or contracted) at both the proximal and distal ITPJ.



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Foot Deformity

A bunion is a structural deformity of the bones and the joint between the foot and big toe, and may be painful.

A bunion is an enlargement of bone or tissue around the joint at the base of the big toe (mtpj). The big toe may turn in toward the second toe, and the tissues surrounding the joint may be swollen and tender.



Foot Deformity

A cross over toe is a condition in which the 2nd toe drifts to the great toe and eventually lies on top of the big toe.

It is a progressive disorder and is the result of abnormal foot biomechanics. The ball of the foot beneath the second toe joint takes an excessive amount of weight-bearing pressure. This pressure eventually leads to weakening of the supportive ligaments and a failure of the joint to stabilize the toe, resulting in the toe crossing over.



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Foot Deformity

Corn (heloma):

Hard area of skin of the toes. Usually caused by ill-fitting shoes, bony prominence or position of a joint within the toes; a hard corn is called a *heloma durum*, while a soft corn is called a *heloma molle*.



The location of soft corns tends to differ from that of hard corns. Hard corns occur on dry, flat surfaces of skin. Soft corns (frequently found between adjacent toes) stay moist, keeping the surrounding skin soft. Soft corns are also sometimes referred to as “kissing corns.”

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Foot Deformity

Charcot arthropathy is a progressive musculoskeletal condition characterized by joint dislocation, fractures and deformities. It results in progressive destruction of bone and soft tissue of weight-bearing joints, most commonly in the foot and ankle. It is most commonly secondary to diabetes.



Before and after reconstructive surgery.

Treatment is usually non-operative, consisting of reduction of stress on the joint by casting, avoiding weight bearing where possible, and elevation to reduce blood flow (decreasing inflammation and bone loss). Only about 25% of cases require surgery.

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Poor circulation (Peripheral Arterial Disease):

- PAD is a build up of plaque on the artery walls of the legs and can cause pain and numbness.
- With PAD, a person's chance of getting an infection is greatly increased and it difficult for the body to fight the infection.
- PAD and diabetes are the leading cause of non-traumatic, lower limb amputations.
- An Ankle Brachial Index (ABI) test compares blood pressure in the extremities.
- Risk of occurrence: 8-12 million Americans; 1 in 5 people over the age of 70 has the disease.



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