

# Diabetes updates

## Growing costs of diabetes called “hidden tax”

The costs of diabetes and pre-diabetes reached \$218 billion in 2007 a new analysis commissioned by Novo Nordisk shows. The increasing number of cases of type 2 diabetes is responsible for the majority of the costs says the study performed by researchers at The Lewin Group and published online as a Web First article on Jan. 14, 2010, in *Health Affairs* ([www.healthaffairs.org](http://www.healthaffairs.org)). The managing director of The Lewin Group said that diabetes hurts every American: “The burden of diabetes and pre-diabetes — \$700 for every man, woman, and child in the country in 2007 — represents a hidden ‘tax’ that we all pay through higher insurance premiums.”

Research published in the American Diabetes Association journal, *Diabetes Care*, projects the country’s diabetic population will double over the next 25 years, with direct annual medical spending on the disease projected to hit \$336 billion in 2034.

According to the analysis of costs in 2007:

- diagnosed type 2 diabetes accounted for \$174.4 billion spent on diabetes, with about \$10,000 per patient;
- undiagnosed type 2 diabetes was responsible for \$18 billion;
- type 1 diabetes totaled \$14.9 billion, with each case totaling about \$15,000;
- pre-diabetes (elevated blood glucose) cost \$25 billion, an average of \$443 per patient; and
- gestational diabetes, which develops in pregnancy, totaled \$636 million.

The chief government affairs officer at Novo Nordisk says that late-stage diabetes is expensive to treat; and based on the lessons of the landmark Diabetes Prevention Program (DPP) trial, he suggested that “the only way to make this effort work on a large scale is through thoughtful, nationally funded programs” to prevent diabetes in those at the highest risk.

## Findings of the DPP trial

According to The National Diabetes Information Clearinghouse, or NIDIC, (<http://diabetes.niddk.nih.gov>): The DPP was a major multicenter clinical research study aimed at discovering whether modest weight loss through dietary changes and increased physical activity or treatment with the oral diabetes drug metformin (Glucophage) could prevent or delay the onset of type 2 diabetes in study participants who, at the beginning of the DPP, were all overweight and pre-diabetic. The DPP trial found that lifestyle modifications (e.g., increased physical activity, moderate weight loss) could cut patients’ rate of developing diabetes by as much as 58% compared with a control group. In a 10-year follow-up of DPP patients published in 2009, the benefits originally seen persisted for a decade with individuals in the lifestyle modification intervention experiencing a 34% lower risk of diabetes than those with no intervention.

## Gene may play role in type 1 diabetes

*ScienceDaily* reported in August 2009 that Stanford University scientists identified a gene that may play a role in the development of type 1 diabetes. Funding for the study came from two components of the National Institutes of Health and from the Special Statutory Funding Program for Type 1 Diabetes Research.

The team examined genes from mice that develop a type 1 diabetes-like disease and found that cells in their pancreatic lymph nodes make two forms of the same gene, known as the deformed epidermal autoregulatory factor 1 (Deaf1). One is full-length and functional, and controls the production of molecules needed to eliminate immune cells that can destroy insulin-producing cells. The other is a shorter, non-functional variant form that prevents the full-length Deaf1 protein from functioning normally. Additional experiments showed that the Deaf1 variant form blocked the genes needed to produce certain molecules involved in immune regulation.

When the researchers measured the levels of these two forms in people with type 1 diabetes and in healthy individuals, levels of the variant form were found to be higher in people with type 1 diabetes compared with those in healthy controls. The variant form, as in mice, inhibited the full-length form from functioning normally.

The researchers propose that the development of type 1 diabetes may be due in part to increased levels of the Deaf1 variant protein in pancreatic lymph nodes of people with this disease. Increased levels of Deaf1 variant may, in turn, lead to reduced production of molecules that are required to educate the immune system not to attack the body’s own cells, including the insulin-producing cells of the pancreas. These results show that Deaf1 variant form is a risk factor for type 1 diabetes and provide a target for drug development to combat the disease.

## Crunching diabetes numbers

Diabetes statistics in the United States for 2009 included some sobering numbers. These were gleaned from the website of the Diabetes Association of Greater Cleveland (DAGC) which names these sources for the stats below: National Diabetes Fact Sheet of the National Center for Chronic Disease Prevention and Health Promotion; National Center for Health Statistics (NCHS); Centers for Disease Control and Prevention; American Diabetes Association; and American Association of Clinical Endocrinologists:

- Cases of diabetes doubled from 1990 to 2005.
- If trends continue unchanged, one out of three children born in 2000 will develop diabetes in his lifetime.
- By 2050, 48 million Americans will have type 2 diabetes.
- Diabetes is the seventh leading cause of death nationally with more than 233,000 deaths per year:
  - Underreported — Government reports indicate that only 35% to 40% of decedents with diabetes have diabetes noted on their death certificates.

- Overall, the risk for death among people with diabetes is about twice that of people without diabetes of similar age.
- NCHS says diabetes is the only major disease besides Alzheimer's with a death rate that continues to rise. Diabetes deaths have climbed 22% since 1990.

The complications of diabetes are not often discussed in news items; however, the DAGC cites statistics on these serious health afflictions emanating from diabetes:

- Of those with diabetes, three out of five people have one other serious health problem; one in three has two other serious health problems; one out of 10 has three other serious health problems; one out of 13 has four or more.
- Diabetes is a leading cause of adult blindness, lower-limb amputation, kidney disease, and nerve damage.
- Approximately 28% develop chronic kidney disease.
- 23% have foot problems, including numbness and amputations.
- The risk for lower extremity amputation is estimated at 15 to 40 times higher among persons with diabetes than among persons without diabetes.
- 5.5 million people in the U.S. have diabetic retinopathy; by 2050 it could increase to 16 to 18 million.
- 40% of people with diabetes suffer some hearing impairment.
- Nearly 65% of individuals with diabetes die from cardiovascular disease in the U.S., establishing it as the leading cause of death among this growing segment of the population.
- Two-thirds of people with diabetes die from a heart attack or stroke.
- Every 24 hours:
  - 4,100 new cases of diabetes are diagnosed.
  - 810 people die from diabetes.
  - 230 people will have a diabetes-related amputation.
  - 120 new patients will require kidney dialysis or transplant.
  - 55 diabetics will go blind.



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