



# Health Sheet

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## **DOCTOR'S NOTES**

To refer a patient to the Division of  
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## **JUVENILE DIABETES Q&A**

### **with Abdollah Sadeghi-Nejad, MD** **pediatric endocrinologist**

#### ***What is Juvenile diabetes?***

Juvenile diabetes literally refers to diabetes mellitus (DM) in juveniles (i.e. in children and adolescents). There are several different types of diabetes mellitus. The two major types are type 1 and type 2. The former (type 1, also called insulin dependent) is caused by an absolute deficiency of insulin, and the latter (type 2 or non-insulin dependent) is primarily the result of insulin resistance. In the past type 1 was mostly seen in children and adolescents and was often referred to as juvenile diabetes or childhood-onset diabetes. In contrast type 2 was virtually limited to adults and at times was called adult type diabetes. Over the past 20–30 years, with the marked increase in the prevalence of obesity in children, the incidence of type 2 diabetes in patients under the age of 18 years has increased and the term juvenile diabetes no longer implies an absolute deficiency of insulin (type 1). Data from the U. S. and elsewhere indicate that currently some 40% of newly diagnosed diabetic children have type 2 diabetes mellitus. Thus the term juvenile diabetes no longer can be used synonymously with insulin deficiency diabetes mellitus (type 1). Similarly the terms childhood-onset and adult-onset DM should no longer be used.

#### ***How is Juvenile diabetes treated?***

Insulin, and its newer short or long acting analogs, is the mainstay of therapy for type 1 diabetes mellitus. In contrast, oral hypoglycemic agents may be useful for treatment of type 2 DM. Currently all types of insulin that are available in the U.S. (Regular, NPH, and 70/30 — a mixture of 70% intermediate-acting and 30% short-acting) are structurally identical to human insulin and are manufactured using biosynthetic techniques. We now also have several long-acting and ultra-short-acting analogs of insulin.

Type 2 DM can best be treated with lifestyle changes such as increased physical activity and decreased caloric intake. It can also be treated with oral medications. However, most type 2 patients eventually require insulin unless lifestyle changes are implemented.

#### ***Is there a cure for Juvenile diabetes?***

Although we have made great strides in the treatment of diabetes mellitus, sadly the answer to this question is no, at the present time there is no cure for type 1 diabetes. However a great deal of time and effort, and huge sums of money are spent in the quest for a cure. Thus, there is reason to be hopeful that a cure might be possible in a not too distant future.

In contrast, type 2 DM responds very well to increased physical activity and decreased caloric intake and can be “cured” if weight loss is achieved and maintained early in the course of the disease.

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### ***What complications can arise as a result of having Juvenile diabetes?***

There is little doubt that the complications of DM are primarily the result of long-standing poor glycemic control. These include micro-vascular and macro-vascular abnormalities, neuropathy, nephropathy, retinopathy, and cardio-vascular disorders, many of which are irreversible. These serious complications usually manifest decades after the onset of diabetes and years of inadequate glycemic control. It is therefore imperative to strive for the best glucose control possible in order to avert or diminish the risk of diabetic complications.

### ***What are symptoms or early signs of Juvenile diabetes we should be aware of?***

Early symptoms and signs are usually mild and are often overlooked for months by parents and relatives, friends, and school personnel. A history of increased drinking and urination, urination in the middle of the night, increased appetite and weight loss should alert us to the possibility of DM, and to look for high blood glucose and presence of glucose in the urine.

### ***Are there genetic predispositions for Juvenile diabetes? Are any gender/race/ethnicities at greater risk?***

Type 1 diabetes mellitus is a multi-factorial disorder. Among them, there are known genetic predisposing risk factors (HLA linked). An identical twin (monozygotic) of a patient with type 1 DM has a 50% likelihood of developing the disease (.6% for a dizygotic twin and 3–6% for a non-twin sibling). The risk of developing DM type 1 is 10% if both parents have the disease (2–5% if one parent is diabetic). For a patient with DM type 1 the risk of having a child with DM is about 1%.

Type 2 DM is also more common in some families and ethnic groups. In the U.S. the risk is highest in females, and in African-Americans, Hispanics, Asians, and Native Americans. Obesity is the major risk factor for the development of type 2 DM. At the present time over one fifth of adults in the U.S. are obese (from 15% in Colorado to greater than 30% in West Virginia, Mississippi, and Hawaii) and their numbers are increasing. The percentage of obese individuals in the rest of the world is similarly skyrocketing. In some Pacific islands (e.g. New Guinea) the prevalence of obesity is as high as 70–80%. Correspondingly, we have seen a dramatic increase in the prevalence of type 2 DM, paralleling the increasing worldwide incidence of obesity. Because obesity is more common in lower educated individuals and lower socioeconomic families, there an increased prevalence of type 2 DM in these groups.

It should be kept in mind that type 2 diabetes is primarily the result of obesity and as such is a preventable disease. Parents can avert the risk of type 2 DM by making sure that their child or adolescent has an appropriate diet, gets adequate age appropriate physical activity, and does not gain excess weight.

### ***How does diet and physical activity prevent Juvenile diabetes?***

Increased physical activity and adherence to an optimal diet do not prevent or cure type 1 DM but significantly contribute to achievement and maintenance of optimal glycemic control and prevention of long-term complications.

In contrast these measures tend to alleviate obesity and prevent type 2 DM. They can also potentially cure type 2 DM if implemented early in the course of disease.

### ***How will Juvenile diabetes treatment affect my child's lifestyle?***

Type 1 diabetes, like other chronic diseases, has a major impact not only on the life of the affected individual, but on the lives of the whole family. Ideally treatment would result in optimal glycemic control with little or no negative impact on the life of the child or his/her family. Unfortunately intensive therapeutic regimens that might achieve near-optimal glycemic control are burdensome and are not compatible with a "normal" lifestyle for many children and their families. As a result, by individualizing the therapy, we attempt to achieve a balance between the best glycemic control possible and minimal negative impact on the children and their families' lifestyle.

The impact of long-standing type 2 DM is similar to that of type 1. However with decreased caloric intake and increased physical activity early on, the disease would be "cured" and would have little or no other impact.

### ***Due to the increasing rate of Juvenile diabetes in our society, how does this impact our rising healthcare costs now and in the future?***

The incidence of type 1 diabetes mellitus has remained relatively stable. In contrast there has been an epidemic-like increase in obesity and type 2 DM in both children and adults. In 2003 there were 13.5 million diabetics in the U.S. It is estimated that the number will increase to 36 million by 2025. The worldwide prevalence for those years is 194 and 333 million respectively. In the last year for which we have complete data (2007) the annual cost of health care for a patient with DM in the U.S. was \$11,744 compared to \$5,106 for a non-diabetic individual. Thus there is no doubt that the increasing prevalence of DM will impose not only a heavy human burden but also a massive financial cost. □

## RESOURCES

Recommended web sites for more information: [www.jdrf.org](http://www.jdrf.org), [www.diabetes.org](http://www.diabetes.org)