

Diabetes in the Global Context



Diabetes prevention program in Nauru

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November 29, 2011

3 types of diabetes:

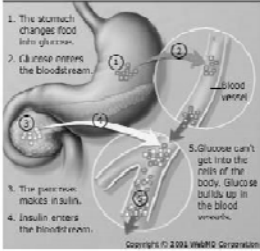
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- Type II (insulin resistant tissues)
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90% of diabetes in the world

Type 2 Diabetes



DIABETES

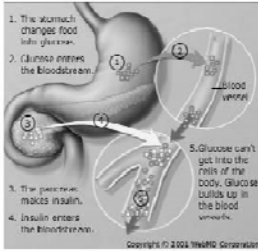
KNOW THE SYMPTOMS

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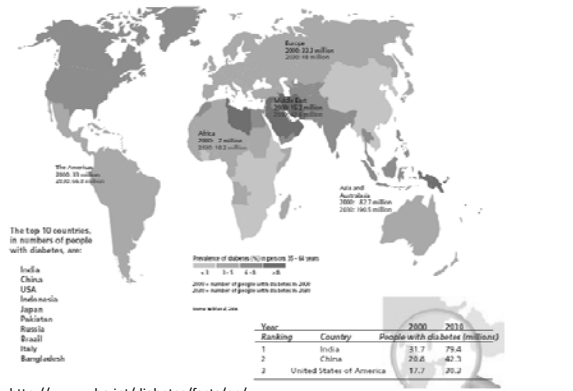
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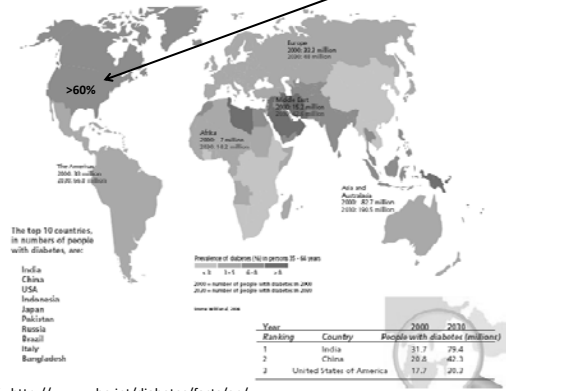


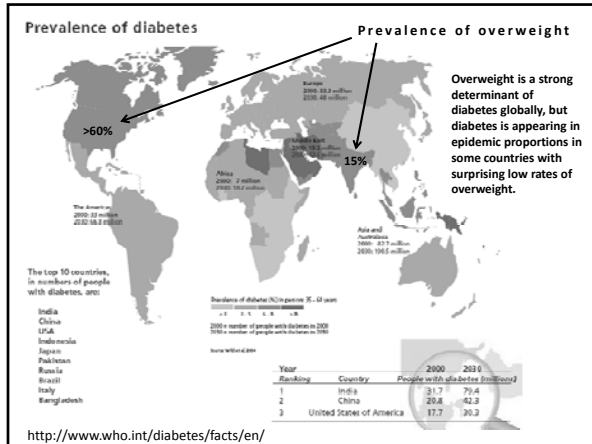
If you have any of these symptoms, see your doctor for more information about diabetes. Call 811 (in the US) and Country or 1 877-338-2373 (in Hong Kong). For more information, visit www.who.int/diabetes

Prevalence of diabetes



Prevalence of diabetes





Global Prevalence of Diabetes

Estimates for the year 2000 and projections for 2030

Source: WHO, UN, ILO, FAO, etc.
Global Burden of Disease Study
World Health Organization

Table 2 — Estimated numbers of people with diabetes by region for 2000 and 2030 and summary of population changes

Region (all ages)	2000	2030	2000-2030		
	Number of people with diabetes	Number of people with diabetes	Percentage of change in number of people with diabetes*	Percentage of change in total population*	Percentage of change in urban population*
Established market economies	11,268	68,156	51	9	80
Former socialist economies	11,665	13,960	20	-14	42
India	31,705	79,441	151	40	168
China	20,757	42,321	104	16	168
Other Asia and Islands	22,328	58,109	148	42	198
Sub-Saharan Africa	7,146	18,685	161	97	147
Latin America and the Caribbean	13,307	32,959	148	40	194
Middle Eastern Crescent	20,031	52,194	163	67	194
World	171,228	366,212	114	37	134

*A positive value indicates an increase, a negative value indicates a decrease.

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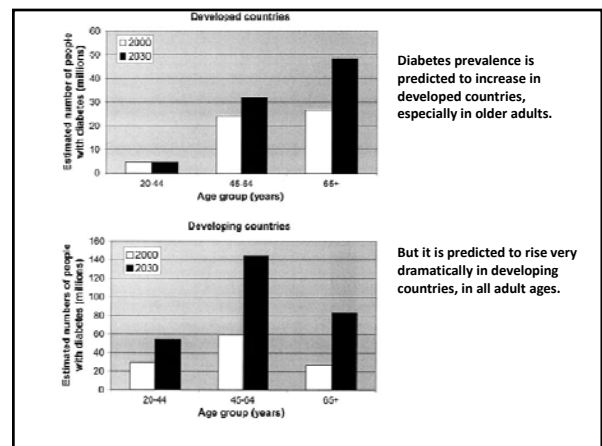
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This model assumes a constant rate of obesity! (how likely is that?)



Diabetes in Africa is particularly deadly:

Diabetologia (2009) 52:8-16 Gill et al. A Sub-Saharan African Perspective on Diabetes 13

Table 3 Diabetes mortality studies in Africa

Country	Year	Diabetes types	Outcome	Mortality causes
Zimbabwe [68]	1990	Mixed—most type 2	41% had died at the 6-year follow-up	Most due to DKA, HNK, hypoglycaemia and infection
Tanzania [69]	1990	Mixed—most type 2	5-year mortality: 18% if not on insulin; 34% on insulin	Metabolic and infectious. Some cardiovascular causes in type 2 patients
South Africa [70, 71]	1995, 2005	All type 1	Mortality rose 16% at 10 years, 47% at 20 years	About half of deaths were nephropathic; others were due to DKA and hypoglycaemia

DKA, diabetic ketoacidosis; HNK, hypotension/ non-ketotic coma

Type II Diabetes (Tanzania, Zimbabwe): 20-40% mortality in approx 5 years

Type I Diabetes:

- South Africa (2 studies, above): 43% mortality by 20 years
- Bamako, Mali: median life expectancy for a child with Type I is 8 years*
- Rural Mozambique: median expectancy for a child is 7 months*

*Cited in Beran & Yudkin, Diabetes care in sub-Saharan Africa. Lancet 2006

The cost of diabetes in Latin America and the Caribbean

Alberto Barceló,¹ Cristian Aedo,² Swapnil Rajpathak,³ & Sylvia Robles⁴

Bulletin of the World Health Organization 2003, 81 (1)

Table 2. Annual cost per person of diabetes care^a by country groups (2000)

Group	Countries	Average cost (US\$) per person
1	Trinidad and Tobago, and Barbados	577
2	Chile and Mexico	607
3	Ecuador, Guatemala and Jamaica	491
4	Bolivia	550

^a The estimates include three visits to a general practitioner, one visit to an ophthalmologist, one HbA_{1c} test, one lipid profile, one electrocardiogram, one proteinuria test and an average of the cost of insulin and oral drugs.

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Diabetes management requires a lot of health care!

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One estimate in Bamako Mali: \$21.24 per month = \$254.88 per year

Cited in Beran & Yudkin, Diabetes care in sub-Saharan Africa. Lancet 2006

Table 6. Estimated total indirect and direct costs attributed to diabetes, per capita direct cost and per capita health expenditures by country in Latin America and the Caribbean

Country	Costs (US\$ x 10 ⁶)			Per capita direct cost (US\$)	Per capita health expenditures (40) (US\$)	Excess cost of diabetes mellitus (%)
	Total	Indirect	Direct			
North America	15 118.3	13 144.1	1974.2	528	221	239
Mexico						
Caribbean (Spanish)	1 346.6	624.1	722.2	1219	139	877
Cuba						
Dominican Republic	625.1	399.4	225.7	888	112	793
Haiti	78.7	20.7	48.0	601	24	2517
Subtotal	2050.7	1054.8	995.9	1076	92	1174

Plus all the other countries in Latin America, omitted for space. . . .

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That's 65 billion dollars

Each diabetic patient requires 3 times the per capita health expenditure

Dietary counseling for diabetics

Dietary counseling for diabetics

American Dietetics Assoc

Mayo Clinic

- **Eat a variety of foods.** Choose foods from each food group every day, and try don't be afraid to try new foods.
- **Pick more fruits and vegetables.** Fruit contains fiber, vitamins and minerals and can satisfy your sweet tooth. Eat at least five servings of fruits and non-starchy vegetables like leafy greens, asparagus, carrots and broccoli each day. Also, choose whole fruit more often and juice less often.
- **Choose healthy carbohydrates.** Increase the amount of fiber you consume by eating at least three servings of whole-grain foods each day. Brown rice, buckwheat, oatmeal, whole-wheat bread and corn bread are good sources of fiber.
- **Eat less fat.** Choose lean meats like poultry and fish whenever possible. Bake, broil, roast, grill, boil or steam foods instead of frying them. Also, choose low-fat or non-fat dairy products.
- **Cut the salt.** Use less salt, more pepper, herbs and seasoning. Eating less salt helps control high blood pressure.
- **Avoid skipping meals.** Skipping meals can make you more hungry, moody and unable to focus. Learn what works best for you. Some people like three meals a day, while others like two meals and two snacks. Find an eating pattern that is healthy for you and stick with it.
- **Slow down and chew.** Eating slowly can actually help you eat less and lose weight. Put your knife and fork down between each bite and chew your food at least 20 times before swallowing.
- **Control your portions.** Keep a record of what you eat and drink, including the amounts. Also, get in the habit of weight or measuring food portions at least a couple of times a month.

Nutrient	Aim for
Carbohydrates	45 to 65% of daily calories
Protein	15 to 20% of daily calories
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- **Choose fiber-rich foods.** Aim for 25-30 g/d. (Some list as above).
- **Limit saturated and trans fats.** Limit solid fats, use low-fat substitutes, choose monounsaturated and polyunsaturated fats
- **Curb dietary cholesterol.** Use lean cuts of meat, choose egg substitutes, opt for skim milk.
- **Eat heart-healthy fish at least twice a week.** Fish can be a good alternative to high-fat meats.

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"Here's the thing about the "diabetes diet": it doesn't really exist."

<http://www.endocrineweb.com/conditions/diabetes/diabetes-food-quiz>, accessed Nov 23, 2009

IDF* Consensus on Prevention of Type 2 Diabetes

*International Diabetes Federation

- For high-risk population
 - Finding the high-risk population
 - Further screening in that population
 - Fasting blood glucose, but also triglycerides, cholesterol, blood pressure
 - Preventive measures
 - Lifestyle intervention or pharmacotherapy
- Population-wide interventions to lower the high-risk population

Diabetes-Medic
J. 2007 | NL... 52 | L... 2

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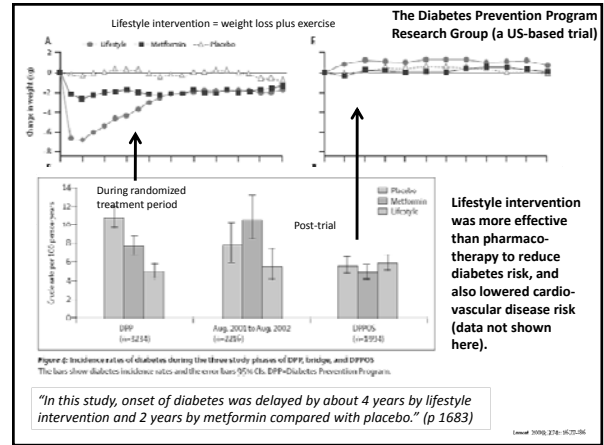
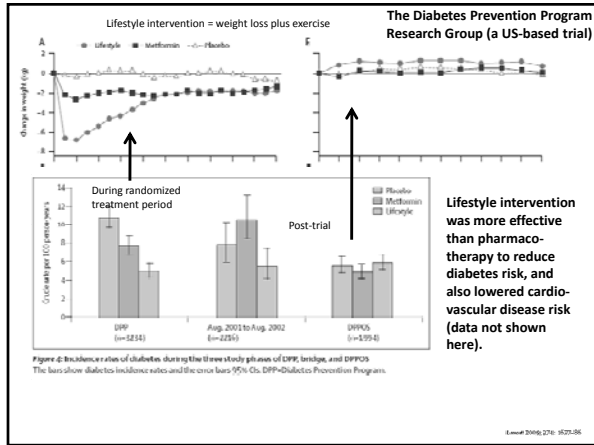
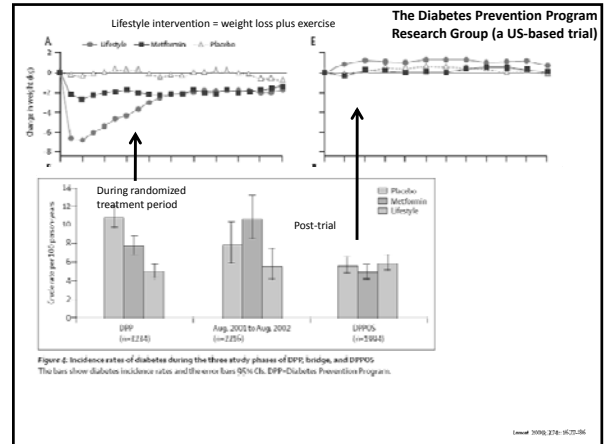
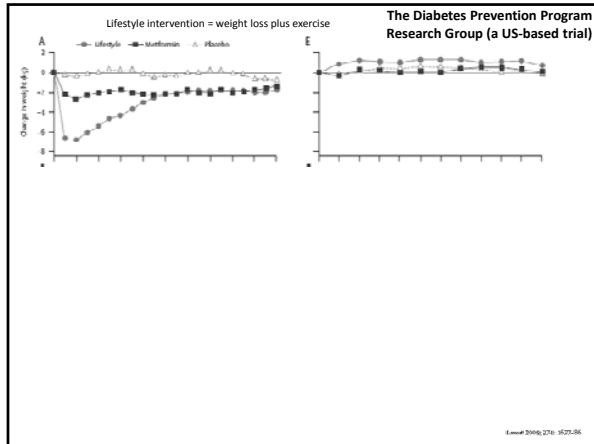
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Figure 1. Questionnaire – suggested questionnaire

The following criteria should be included in the questionnaire. This consensus of any of them puts people at higher risk; further investigations should be undertaken to assess levels of risk.

Obesity	Central obesity is most easily measured by waist circumference with cut-off points that are gender and ethnicity-specific. For example, the waist circumference cut point for European men is 104 cm, for European women it is 94 cm.
Family history	Immediate family member or other relative diagnosed with diabetes.
Age	People over the following ages are at an increased risk: >45 years in European; >35 years in the rest of the world.
Cardiovascular history	History of raised blood pressure and/or heart disease.
Gestational history	Previous gestational diabetes.
Drug history	Use of drugs that predispose a patient to type 2 diabetes, including: alcohol; oral; glucocorticoids; thyroid hormone; beta-adrenergic antagonists; thiazides; diuretics; pentamidine; antipsychotics; agents used for HIV therapy.

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Lancet Nutrition Series Paper 2 examined the relation between maternal and child undernutrition and chronic disease (incl. diabetes) and concluded:

- Children who are undernourished in the first 2 years of life and who put on weight rapidly later in childhood and in adolescence are at high risk of chronic diseases related to nutrition
- There is no evidence that rapid weight or length gain in the first 2 years of life increases the risk of chronic disease, even in children with poor fetal growth

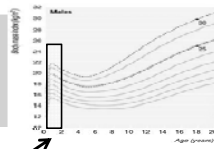
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Figure 2: BMI (kg/m²) vs Age (years). The graph shows that children who are undernourished in the first 2 years of life and who put on weight rapidly later in childhood and in adolescence are at high risk of chronic diseases related to nutrition.

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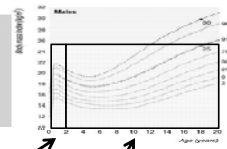
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This means that:
Interventions to improve child growth and nutrition in the first 2 years of life do not increase risk of chronic disease, even in LBW (IUGR) babies.

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This means that:
Interventions to improve child growth and nutrition in the first 2 years of life do not increase risk of chronic disease, even in LBW (IUGR) babies.

BUT, interventions that cause greater growth (predominantly weight gain) after this critical window, DO increase risk of chronic diseases—even in (especially in?) children who were undernourished before 2 years.

Diabetes and breastfeeding

- Does maternal diabetes affect breastfeeding?
 - Type I:
 - Mothers with type 1 diabetes can breastfeed successfully, and breastfeeding substantially lowers insulin requirements
 - BUT success requires careful and intensive management of diabetes (as does surviving to adulthood, and successful conception and pregnancy)
 - Type II and gestational diabetes:
 - Major issue is overweight/obesity, and the resulting mechanical issues associated with lactation.

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 - Type II and gestational diabetes:
 - Major issue is overweight/obesity, and the resulting mechanical issues associated with lactation.
- Does breastfeeding affect diabetes risk in the child?
 - Jury is still out; no convincing evidence.

Challenges in diabetes control in low-income countries

- **National policy environment**
 - Typically no policy discussions in place for NCD's
 - Control requires multisectoral approach—beyond health sector—difficult to coordinate
 - Lack of MDG means little donor attention, which affects motivation
 - Lack of good data
- **Healthcare systems**
 - Problems with drug procurement and cost (esp. insulin)
 - Lack of health insurance to create affordability of care
 - Inaccessibility of facilities and equipment
 - Poor referral systems
- **Health care professionals**
 - Lack of personnel
 - Lack of training—(My work in TZ: especially in nutrition)
 - Lack of resources: time, supplies, materials
- **Patients**
 - Poverty—lack of access to dietary diversity
 - Lack of education, and also tools for understanding diet (e.g. food labels)
 - Lack of support structures, community groups, etc.