

The Importance and Content of a Diabetes Prevention Program (DPP)

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Date posted: 11/16/2010

Any organization which treats patients with diabetes must make sure that it identifies patients who have diabetes but who have not yet been diagnosed. Electronic health records (EHR) make it possible to develop and deploy a diabetes prevention program which can consistently provide screening for high risk patients and can identify those patients which have moved from high risk to pre-diabetes to diabetes. There are millions of Americans who have diabetes and don't know it; therefore primary care providers must be vigilant to recognize those who have undiagnosed diabetes. Additionally, they must be attentive to those patents who should be screened for diabetes; to those who are at high risk of developing diabetes and particularly to those who have pre-diabetes.


It would be tragic, for primary care providers to give excellent care to patients diagnosed with diabetes and to be seeing patients who have diabetes and not be giving them appropriate care because they are not diagnosed. As a result, Quality 101 recommends the following Diabetes Prevention Program (DPP).

The Steps of a Diabetes Prevention Program (DPP)

The first step in the screening for and the preventing of diabetes is for healthcare providers to always have diabetes in the forefront of their attention as they see all patients in the clinic, the nursing home, the hospital, or other sites.

One clinic starts seeing a patient from what they refer to as the "AAA Home" template. This template lists all of the electronic-patient-management tools and alerts healthcare providers and nurses to those tools which need to be reviewed and completed for each patient.

On the "AAA Home" template, the second tool listed under "Preventive Care" is entitled "Preventing Diabetes." When the patient being seen meets the criteria for needing screening for diabetes, the title "**Preventing Diabetes**" will be displayed in **red**.



Patient [Redacted] Sex M Age 72 Patient's Code Status [Redacted]
 Home Phone [Redacted] Date of Birth [Redacted]
 Work Phone [Redacted]

Patient has one or more alerts!
[Click Here to View Alerts](#)

Pre-Vist/Preventive Screening [Bridges to Excellence](#)

Preventive Care SETMA's LESS Initiative I Last Updated 08/30/2010 Preventing Diabetes I Last Updated // Preventing Hypertension I Medical Home Coordination <i>Needs Attention!!</i> HEDIS NQF PQR Elderly Medication Summary Exercise Exercise I CHF Exercise I Diabetic Exercise I	Template Suites Master GP I Pediatrics Nursing Home I Ophthalmology Physical Therapy Podiatry Rheumatology Hospital Care Hospital Care Summary I Daily Progress Note Admission Orders I Pending Referrals I	Disease Management Diabetes I Hypertension I Lipids I Acute Coronary Syn I Angina I Asthma Cardiometabolic Risk Syn I CHF I Diabetes Education Headaches Renal Failure Weight Management I	Last Updated 07/06/2010 08/30/2010 05/19/2010 // // // // // // // //	Special Functions Lab Future I Lab Results I Hydration I Nutrition I Guidelines I Pain Management I Information Charge Posting Tutorial Drug Interactions I E&M Coding Recommendations ICD-9 Code Tutorial Insulin Infusion
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Patient's Pharmacy
 CVS - Eastex#105
 Phone (409)892-8511
 Fax (409)892-8462

Rx Sheet - Active
 Rx Sheet - New
 Rx Sheet - Complete
 Home Health

Status	Priority	Referral	Referring Provider
Completed	Routine	Echocardiogram	Henderson
Completed	Routine	CT	Henderson
Completed	Routine	Bone Density	Henderson
Completed	Immediate	Nephrology	Ahmed
Completed	Immediate	Sotolongo, Rodolfo	Aeiz
Completed	Immediate	Holland Jr, Inesbh	Aeiz

Chart Note
Return Info
Return Doc
Email
Telephone
Records Request
Transfer of Care Doc

It must be remembered that there are not only two categories of patients in regard to diabetes, i.e., those who have it and those who do not, but there are two other categories. There are patients who are at high risk of diabetes and there are patients who have pre-diabetes. Pre-diabetes is a condition where a patient has progressed to a point where their ability to handle blood sugar is affected negatively and to where they have increased risk of heart disease and other complications, which, while not as severe as a patient who has diabetes, is more severe than a person who is simply at higher risk for the development of diabetes.

The DPP mission is to identify these groups:

1. Patients who have diabetes
2. Patients who don't have diabetes
3. Patients who are at high risk for diabetes
4. Patients who have pre-diabetes

- Patients who, while they are not at high-risk and/or who do not have pre-diabetes, nevertheless are of an age or condition that they should be screened for diabetes.

In this context, when a healthcare provider “clicks on” the “Preventing Diabetes” title, the following template is deployed.

Preventing Diabetes Patient [REDACTED]

[Screening Recommendations](#) [Predicting Diabetes](#) [Screening Insulin Resistance](#) [IFG and IGT](#) [Current Strategies](#)
[Could You Have Diabetes and Not Even Know It?](#) [Reducing Your Risk](#) [LOW Risk of Developing Diabetes](#)

Return
Document

Patient Information
[What is Pre-Diabetes?](#)
[Carb Confusion](#)
[What To Do About It](#)
[Taking Steps To Prevent You Have The Power](#)
[More Than 50 Ways To Prevent Importance of Glycemic Index](#)
[Applying the Glycemic Index](#)
[Glycemic Load](#)
[Insulin - Friend or Foe](#)
[Hyperinsulinemia](#)
[Hunger, Insulin, and Meals](#)
[Hunger, Fat, and Fav Foods](#)
[Print All](#)

Prediabetics have an atherogenic pattern of CV risk factors which are predominantly observed in prediabetics with increased HOMA IR and fasting insulin, i.e., insulin resistance.

Diagnosis	Fasting Test	Casual Test
Diabetes	> 126 mg/dL	> 200 mg/dL
Pre-Diabetes	100 - 125 mg/dL	140 - 199 mg/dL
None	< 100 mg/dL	< 140 mg/dL

Vital Signs

Height	64.00	Waist	42.00
Weight	130.01	Hips	35.00
BMI	22.31	Ratio	.00
Body Fat	45	Blood Pressure	
BMR			
Protein Req			

Fasting Lab Results

FPG	136	Cholesterol	212	12/02/2009
1/15/2009		HDL	36	12/02/2009
2-Hr OGTT	///	LDL	145	12/02/2009
		Triglycerides	312	12/02/2009
		Magnesium	///	

DM Prediction Rule
4 > 4 doubles the risk of DM

Treatment

Insulin Resistance	Homocysteine
Impaired Fasting Glucose	hsCRP
Hypertriglyceridemia	Endothelial Dysfunction

Diabetic Education Referral (Double-Click)

Priority	Referring First	Referring Last	Referral
Routine	Dia	Abochamah	asdf

Links
[Insulin Resistance](#) [Hypertension Mgmt](#) [Weight Mgmt](#) [Exercise](#) [Lipids Mgmt](#) [Metabolic Syndrome](#) [Smoking Cessation](#)

Provider Information
[Glycemic Index and Prevention](#)
[Weight Loss](#)
[Physical Activity](#)
[Behavior Modifications](#)
[Summary of Studies](#)
[Lifestyle and Diabetes](#)
[Visceral Fat](#)
[Insulin Resistance Summary](#)
[Questions and Answers](#)

While this template appears busy, it contains a wealth of information which is valuable to the provider’s evaluation of the patient’s health. The following is a description of its content:

- Across the top are eight tools which are described below.
- Next there are the definitions of diabetes and of pre-diabetes. These are the standards of diagnoses which the provider will use in evaluating your status. One new standard will be added and that is if your hemoglobin A1C is 6.5% or greater on two occasions, the patient should also be diagnosed with diabetes. The following is a brief summary of how diabetes is diagnosed:
 - A patient has fasting blood glucose of 126 mg/dl on two separate occasions.
 - A patient has a random blood glucose of 200 mg/dl or higher
 - A patient has a 2-hour Glucose Tolerance Test with a two-hour blood glucose value of 200 or greater.
 - A patient has a HgbA1C of 6.5% or higher on two different days.

3. The patient's Vital signs, Fasting lab Results and cholesterol results. The reason for this is that blood pressure and cholesterol are critical parts of the treatment of diabetes, pre-diabetes and those who are at high risk of the development of diabetes.
4. Treatment of conditions associated with pre-diabetes, diabetes and those at high risk of the development of diabetes.
5. Links to other patient management tools which will be used in a DPP.
6. Down the right-hand side of the template are a series of education pieces which the provider can give to the patient, which will help the patient manage his/her health.

The first tool listed at the top of this screen is entitled “**Screening Recommendations.**” When the tool is deployed it is entitled “**Recommendations to Delay or Prevent Diabetes.**”

The screenshot shows a window titled "Diabetes Screen" with a close button in the top right corner. The main heading is "Recommendations to Delay or Prevent Diabetes" in blue text. Below the heading is a paragraph: "Individuals at high risk for developing diabetes need to become aware of the benefits of modest weight loss and participating in regular physical activity."

The section "Screening Recommendations for Pre-Diabetes (IFG, IGT)" contains the following options:

- Patients > 45 years of age (recommended)
- Patients > 45 years of age with a BMI > 25 (required)
- Patients < 45 years of age, BMI >25 plus any one of the following risk factors (required)
 - Yes No Family history of diabetes?
 - Yes No Non-Caucasian ethnicity?
 - Yes No Dyslipidemia?
 - Yes No Hypertension?
 - Yes No Personal history of gestational diabetes or a baby weighing > 9 pounds?
- In individuals with normoglycemia, rescreening at 3-year intervals is sufficient.

The "How To Screen" section contains:

- Fasting Plasma Glucose Test Sent Successfully
- 2-hour OGTT (75 gram glucose load) (if FPG > 110)
- Positive test results should be confirmed at another office visit on another day.

At the bottom are "OK" and "Cancel" buttons.

When deployed this tool automatically assesses whether screening for diabetes is “recommended” or “required.” The healthcare provider does not have to “look up” this information. The electronic health record automatically collects the results from ‘structured fields’ in the record and alerts the provider to check whether or not the patient needs screening. This is the same material on the basis of which the “Preventing Diabetes” button on AAA Home is turned red or not.

If the patient requires screening, the provider will click the button entitled “Order These Tests.” At that point a message will appear asking if the patient has been fasting for twelve hours. If he/she has, the Fasting Plasma Glucose can be ordered at that time.

If the Fasting plasma glucose is between 100 and 125, the patient will be diagnosed with “Impaired Fasting Glucose”. This is a Pre-diabetes condition and it is a more serious condition than simply having an increased risk of diabetes and requires immediate and persistent steps in order to delay, or to prevent the onset of diabetes.

If the 2-hour result of the 2-hour Glucose tolerance test is between 140 and 199, you will be diagnosed with “Impaired Glucose tolerance”. This is also a Pre-diabetes condition and it is even more serious than Impaired Fasting Glucose. It should result in immediate and serious alterations of life style in order to delay or prevent the onset of diabetes. Those steps are weight reduction, dietary counseling and modification and a regular, consistent exercise program. Also, control of cholesterol and blood pressure should be achieved and maintained.

Predicting the Development of Diabetes in Older Adults

If the patient is over 65 years of age, this tool allows the provider to estimate the patient’s risk of the development of diabetes without first doing a 2-hour Glucose Tolerance Test. The details of this tool can be read on the template. Again, the content is automatically displayed. If the score is above 4, the patient is at higher risk of developing diabetes and preventive steps should be taken.

Diabetes Predict X

Predicting the Development of Diabetes in Older Adults: The derivation and validation of a prediction rule.

Diabetes Care, Volume 28, Number 2, February, 2005

Objective

To create a simple prediction rule that could perform as well as the 2-hour post challenge plasma glucose test to predict those at risk for diabetes.

Conclusion

1. Advanced age,
2. female sex,
3. fasting plasma glucose and
4. triglycerides

were able to predict adults at risk for diabetes equally as well as the 2-hour Post challenge Plasma Glucose (PCPG).

Sex	<input type="text" value="F"/>				
Age	<input type="text" value="108"/>	yrs	<input type="button" value="Calculate >>"/>	<input type="text" value="4"/>	points
Triglycerides	<input type="text" value="312"/>	mg/dL	Last Updated <input type="text" value="09/25/2010"/>		
Fasting Glucose	<input type="text" value="136"/>	mg/dL			

Interpretation

A score of 4 or higher doubled the likelihood of an abnormal post challenge glucose test result. This rule could help clinicians to better identify individuals with abnormal glucose tolerance, who should be targeted for interventions to prevent diabetes.

And, if the result is 4 or over, the provider will want to order a 2-hour GTT.

Screening for Insulin Resistance

The role of insulin is not commonly known. Everyone knows that it has something to do with diabetes, but what? Insulin is produced by the pancreas. It is needed by the body to regulate, along with other substances, the blood sugar level of the body. Insulin principally works by moving blood sugar into the liver and into muscles. Insulin also “signals” the liver to stop making make sugar (glucose) out of the protein and carbohydrates you have eaten. In a number of circumstances, the liver and muscles do not respond to insulin. This is called “insulin resistance,” and is the precursor to type 2 diabetes.

Insulin Resistance is the first evidence of progression toward the development of type 2 diabetes. Some of the contributing cases to insulin resistance are age, genetics, obesity and a sedentary life style. In order to recognize insulin resistance and to take steps to reverse it and to prevent the

development of diabetes, providers should evaluate your risk of insulin resistance. The following template does that.

Diabetes Insulins

Screening for Insulin Resistance

The following are factors which increase the likelihood of insulin resistance...

Yes No Diagnosis of CVD, hypertension, PCOS, NAFLD, or acanthosis nigricans?
 Yes No Non-Caucasian ethnicity?
 Yes No Family history of diabetes, hypertension, or CVD?
 Yes No Personal history of gestational diabetes or glucose intolerance?
 Yes No Sedentary lifestyle?
 Yes No Elevated BMI?
 Yes No Elevated waist circumference? (Males>40", Females>35")
 Yes No Patient over 40?

The following are abnormalities of the insulin resistance syndrome...

Yes No Elevated triglycerides? 312 12/02/2009
 Yes No Low HDL cholesterol? 36 12/02/2009
 Yes No Elevated blood pressure? 145 / 95
 Yes No Elevated glucose levels? Fasting 136 01/15/2009
 2 Hr OGTT //

Based on the risk factors and abnormalities indicated above...

Conclusion?

This patient has one or more risk factors AND two or more abnormalities which indicate the presence of the insulin resistance syndrome.

OK Cancel

In addition, a provider can calculate several numerical scores which indicate the presence of insulin resistance; they are:

- **HDL/Triglyceride ratio** – if this ratio is above 2, it is indicative of insulin resistance. A provider can give the patient this result whenever the cholesterol is checked.
- **Cardiometabolic Risk Syndrome** – Previously referred to as Syndrome X, Insulin Resistance Syndrome or Metabolic Syndrome, the presence of the Cardiometabolic Risk Syndrome is indicative of the presence of insulin resistance. A provider can routinely assess the presence of this condition with standards published by both the World Health Organization and the ATP-III (Third Report of the Expert Panel on Detection, Evaluation, and Treatment of High Blood Cholesterol in Adults (Adult Treatment Panel III)).

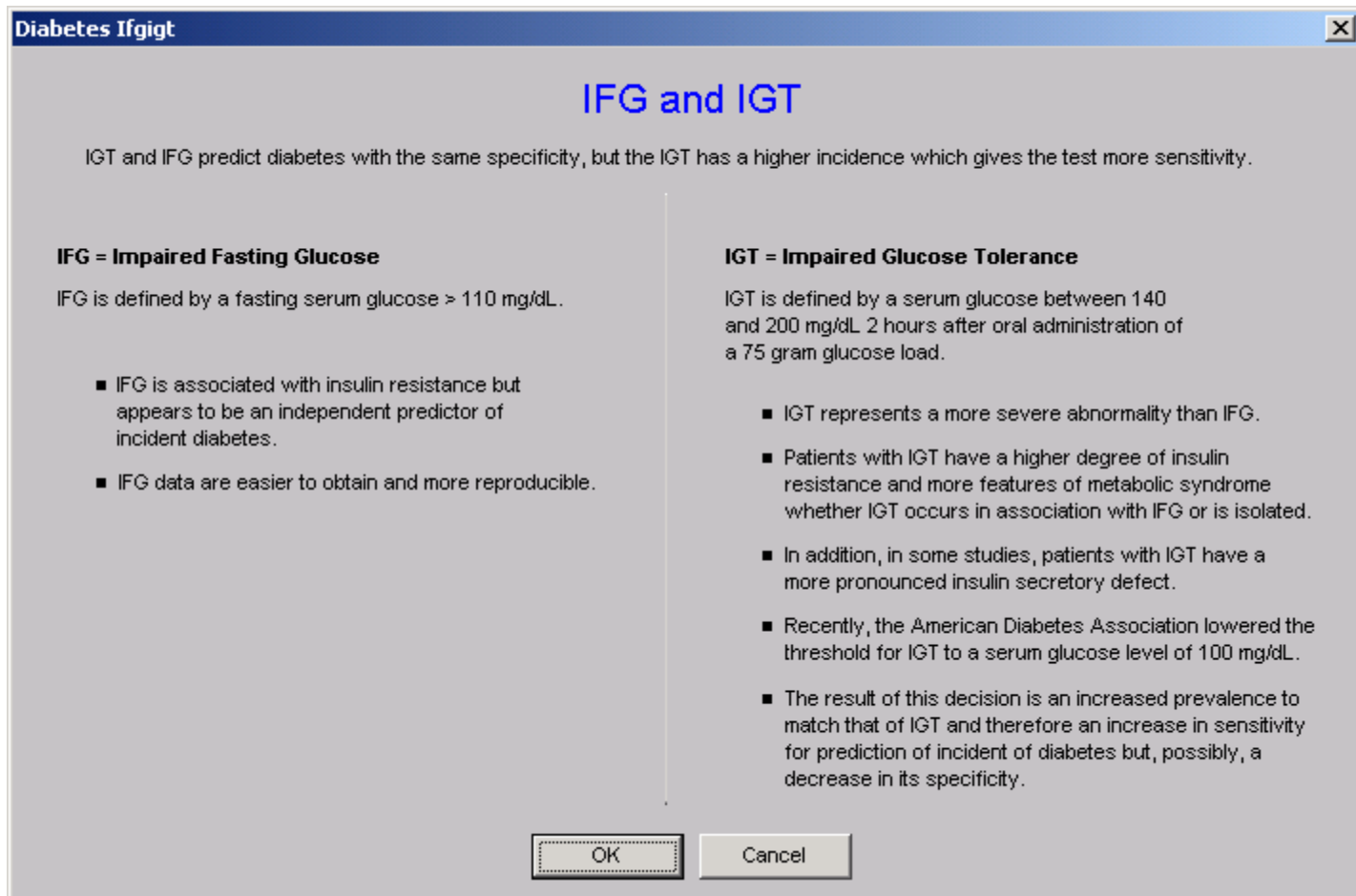
- **HOMA-IR** (Homeostasis Model Assessment of Insulin Resistance) – this score is based on an equation calculated with a fasting insulin level and a fasting blood sugar. When the HOMA-IR is above 2; it is indicative of the presence of insulin resistance.
- **Fasting Insulin Level** – when elevated insulin is present in the fasting state, it is suggestive of insulin resistance which results in increased insulin levels to compensate for the liver and muscles decreased response to insulin.

If a patient has insulin resistance and does not yet have diabetes, steps **MUST** be taken to lose weight, exercise, stop smoking, reduce stress, and get proper sleep in order to delay or avoid diabetes.

IFG and IGT

A valuable guide for developing electronic patient management tools is to display all of the information a provider needs in order to provide excellent care. This is based on the desire to make sure that a provider has access not just to what he/she knows but to what is known about a condition. And, it is based on the principle that what you absolutely must remember, you often forget, but that which you do not have to remember, you rarely forget. Therefore, a EHR will try to make all that a provider needs to know available, which means that he/she will rarely if ever forget that which is important.

The definitions of Impaired Fasting Glucose (IFG) and of Impaired Glucose Tolerance (IGT) are critical to the diagnosis of Pre-diabetes and to the prevention of diabetes, thus they are displayed. Providers don't have to remember them, therefore, they always do. The definitions of IFG and IGT and important ideas about both are presented on this template.



Could you have diabetes and not even know it?

With the single click of a button, the healthcare provider or nurse can give the patient a numerical summary of their risk of developing diabetes. If the patient is at high risk, steps to avoid diabetes or at least delay its onset can be taken.



Could You Have Diabetes And Not Even Know It?

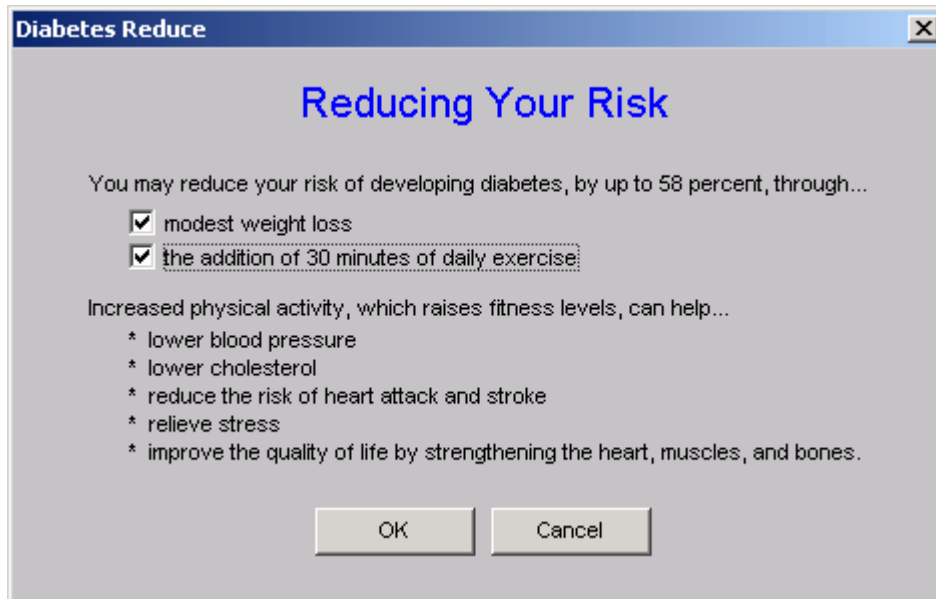
1. My weight is abnormal as indicated by my BMI or body fat percentage? Yes No
2. I am under 65 years of age AND I get little or no exercise during a usual day? Yes No
3. I am between 45 and 65 years of age? Yes No
4. I am 65 years old or older? Yes No
5. I am woman who has had a baby weighing more than 9 pounds at birth? Yes No
6. I have a brother or sister with diabetes? Yes No
7. I have a parent with diabetes? Yes No

Point Total**Conclusion**

You are at greater risk for having diabetes. Talk with your health care provider to determine if you have diabetes.

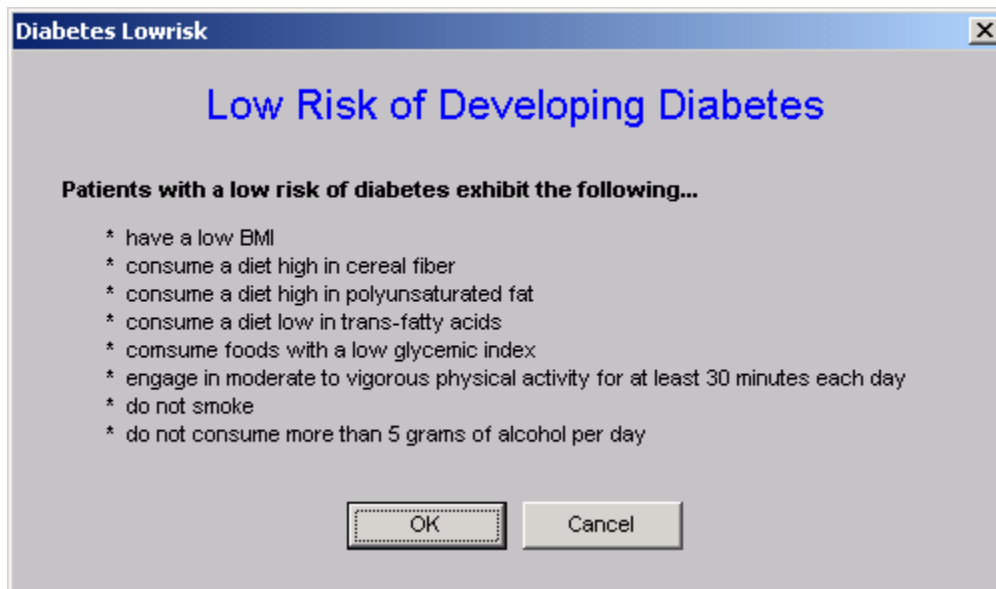
Reducing Your Risk

The following steps can help the patient reduce their risk of developing diabetes.



Low Risk of Developing Diabetes

The following characteristics, developed from a major study of nurses, are those of people with a very low risk of developing diabetes.



Summary

It is possible to live successfully with diabetes should a patient develop it; however, it is better for the patient to know their risk of developing diabetes and to take steps to delay or prevent its onset. Primary care providers should be committed to:

- Excellent care of those with diabetes and
- Identifying those at increased risk of diabetes
- Identifying those who have pre-diabetes.

And that commitment should extend to teaching the latter two groups how to avoid or delay the onset of diabetes. A diabetes prevention program, similar to the one illustrated and one which is electronically deployed makes it easy to consistently perform these simple yet complex tasks with every patient seen in a busy primary care practice.