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an educational exchange on underwriting issues

authored by Legal & General America's medical and underwriting specialists
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Diabetes

"The aim of insurance testing for diabetes is to detect undiagnosed cases and determine the level of control in those with known diabetes."

Diabetes is a syndrome characterized by hyperglycemia (high blood sugar) in which there is an inadequate amount of insulin for the needs of the body (type-1) or the insulin that is produced is ineffective (type-2). Symptoms of diabetes include frequent urination, excessive thirst, extreme hunger, unusual weight loss, increased fatigue and blurry vision.

The Centers for Disease Control estimates that in the United States diabetes affects 18.2 million people or 6.3 percent of the population. Of this group, nearly a third are undiagnosed. Insurance testing discovers some of them.

The diagnosis of diabetes is made based on the presence of an elevated fasting plasma glucose of 126 mg/dl or higher, random plasma glucose of at least 200 mg/dl with suggestive symptoms or an abnormal glucose tolerance test (table 1). The oral glucose tolerance test (OGTT) is the gold standard for diagnosing diabetes and is performed by measuring blood glucose levels after ingesting a glucose rich drink. The diagnosis of diabetes is made if the plasma glucose level is 200 mg/dl or higher two hours after the drink. Hemoglobin A1c is a test that is very familiar to most involved in underwriting life insurance. It is used mainly to evaluate the level of control of diabetes for the past few months. Several studies validate its use in diagnosing diabetes at values of 6.0 and higher. There is convincing evidence that overall mortality begins to increase at levels of HbA1c above 5.0 even in non-diabetics.

Table 1: Diagnostic Criteria for Diabetes

Criteria	Pre Diabetes or Impaired Glucose Tolerance	Diabetes
Fasting plasma glucose	110 to 125 mg/dl	$\geq$ 126 mg/dl
Random plasma glucose		$\geq$ 200 mg/dl and symptoms of diabetes
2 Hr plasma glucose on OGTT	140 to 199 mg/dl	$\geq$ 200 mg/dl
HbA1c		$\geq$ 6.0

Type-1 Diabetes is caused by autoimmune destruction of the beta cells of the pancreas causing absolute insulin deficiency. Those with type-1 diabetes are prone to other autoimmune disorders such as Hashimoto's thyroiditis, pernicious anemia, and Addison's disease. Intensive therapy with parenteral (subcutaneous injection) insulin is the mainstay of therapy for type-1 diabetes and the goal is to maintain HbA1c close to normal (6.0 to 7.0). The side effects of this type of therapy are hypoglycemic (low blood sugar) reactions and weight gain. In cases that are difficult to manage, use of an insulin pump reduces the incidence of hypoglycemia.

Type-2 Diabetes is a disorder characterized by varying combinations of defects in beta cell secretion of insulin and insulin resistance. More than 80 percent of diabetics in the United States have type-2 diabetes. Type-2 diabetes has a strong genetic component. An affected individual has a 25 percent probability of having an affected parent. Metabolic syndrome and impaired glucose tolerance are precursors to diabetes.

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Type-2 diabetes is a progressive disorder and is a major risk factor for cardiovascular disease. The prevalence of obesity, hypertension and elevated lipids is high in type-2 diabetes. Since cardiovascular disorders and kidney disease cause most of the deaths (table 2), the goal of therapy is prevention of these diseases. Reducing blood sugar and maintaining HbA1c as close to normal as possible is the first step. As most patients with type-2 diabetes are obese, they require a weight reducing diet. A loss of 10 to 20 pounds lowers glucose levels and alleviates symptoms. Daily exercise improves control of blood sugar by improving the effectiveness of insulin. Risk of a future myocardial infarction in diabetics with no history of CAD is similar to non-diabetics who have already had a myocardial infarction. Consequently, reducing LDL to less than 100 mg/dl and raising HDL are integral components of therapy. If the fasting glucose level continues to be above 140 mg/dL, one or two anti-diabetic oral medications are prescribed. If the blood sugar control is inadequate with oral medications, insulin therapy is added. Optimal blood pressure control and judicious use of medications, such as ACE (angiotensin converting enzyme) inhibitors or ARBS (angiotensin receptor blockers), can help protect the kidney.

Gestational diabetes mellitus (GDM) is a form of glucose intolerance that has onset or first recognition during pregnancy. The diagnosis of GDM is made using the usual diagnostic criteria for diabetes. Maternal complications of GDM include hypertensive disorders such as toxemia and increased incidence of cesarean delivery. During pregnancy, treatment to keep blood sugar level normal is essential to prevent complications to the fetus. After delivery 5 to 10 percent will continue to have diabetes. Women with GDM have a 50 percent chance of developing diabetes over the ensuing 10 years.

Insurance testing for diabetes: The aim of testing is to detect undiagnosed cases and determine the level of control in those with known diabetes. In the past the industry has not put much emphasis on detecting undiagnosed cases. Given the rising incidence of diabetes, continuing on this path is not prudent.

Blood glucose and fructosamine testing are performed on all applicants for life insurance and HBA1c is analyzed on those forty and older. The urine is tested for microalbumin on all applicants with a history of diabetes or those discovered on insurance testing to have diabetes. Blood glucose is unreliable as a diagnostic test for diabetes in the insurance testing environment due to processing problems. Although inexpensive, screening with fructosamine is unreliable as it misses many cases. HbA1c, in addition to being a dependable screening test for diabetes, has the added benefit of measuring blood sugar control in those with known diabetes. Performing HbA1c and microalbumin testing early in the underwriting process facilitates appropriate pricing of risks and expeditious issuing of cases.

Table 2: Complications of Diabetes That Cause Increased Mortality

Complications	Impact
Heart Disease	Leading cause of diabetes-related death. Death rate is 2 to 4 times that of those without diabetes.
Stroke	Risk of stroke is 2 to 4 times that of those without diabetes.
HBP	70+% of adults with diabetes have hypertension.
Kidney Disease	Leading cause of kidney failure, accounting for 44% of cases.

Underwriting diabetes is a complex process. It begins with assessing basic debits for diabetes for age of onset and the type of diabetes. Then additional debits or credits are assigned for blood sugar control (HbA1c levels), CAD risk factors such as LDL (bad) cholesterol, CRP (C-reactive-protein), HDL (good) cholesterol, weight, blood pressure and microalbumin. Net debits or credits are used to modify the basic rating. The presence of complications such as proliferative retinopathy and neuropathy would warrant additional debits. For a given age of onset, the best rates are given to those diabetics without complications, low or absent microalbumin and good long-term control of HbA1c and cardiac risk factors. Such an applicant, with diabetes onset at age fifty or older, could be classified as standard plus.