



# News & Views *The Scoop*

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## *New Development in Diabetic Testing AGP (Advance Glycation Product)*

### **Subject:**

Diabetes Detection in the Life and Living Benefits Insurance Population.

### **Objective:**

To provide a cost effective test to identify a greater number of individuals suffering from *Diabetes*.

### **Background:**

The incidence of *Diabetes* in North American has increased 50% in the past 10 years with the American Diabetes Association reporting that 40% of people with diabetes being undiagnosed! The identification of this undiagnosed group is key to the maintenance of profitable underwriting. To improve the identification of all diabetic risks one might consider ordering a hemoglobin A1c on all applicants. However would the added expense be cost justified? In reviewing this topic it is most important to recognize that blood glucose and fructosamine testing have been the front line tests for the initial screening of insurance applicants with blood glucose having the better sensitivity. However, it is important to recognize that the blood sugar levels can be artificially low due to a failure to centrifuge samples within two hours of collection. In addition, normal glucose values have been reported from diabetic applicants after prolonged fasting or a recent injection of insulin. Fructosamine testing was initially introduced to identify samples from diabetic applicants that had not been centrifuged after collection. However, fructosamine has been found to be insensitive and non-specific.

### **Question:**

Do the numbers of diabetics identified in the insurance community mirror the increase in the incidence in the general population? We suspect they do not! If not, why?

### **Fact:**

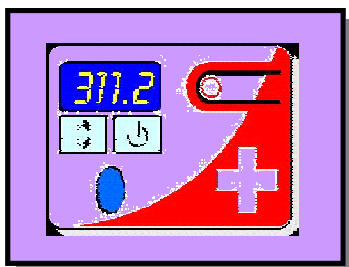
Our data shows that well over half of the hemoglobin A1c positive applicants have normal fructosamine values. More troubling, approximately 23% of hemoglobin A1c positive samples have both normal fructosamine and glucose levels.

**AGP**

**New Develop-  
ment**

**In**

**Diabetic Testing**



**Solution:**

Establish a more cost effective marker that detects applicants with abnormal blood sugar levels. A marker more specific and cost effective than existing tests and less impacted by external handling prior to the analysis.

**Insurance Study:**

We have identified a new advanced glycation product (AGP). Advanced glycation products (AGP) are formed during the reaction of blood glucose with serum proteins and lipids. The concentration of AGP is proportional to the average glucose concentration over the prior two to four weeks. To study the improvement in diabetes detection, we randomly selected blood samples from insurance applicants ages 50 and up. All of these samples were tested for fructosamine, glucose, AGP, and hemoglobin A1c. The table below shows the results of fructosamine, glucose and AGP testing for all hemoglobin A1c positive applicants in the study.

**Test Results for Fructosamine, Glucose and AGP for 245 Hemoglobin A1c Positive Applicants:**

	A1c Positive	A1c Negative
Fructosamine (2.1 mg/dL)	24%	<b>76%</b>
Glucose (109 mg/dL) 27%	27%	73%
AGP (230 units/dL) 67%	67%	33%
Fructosamine + Glucose	40%	<b>60%</b>
Fructosamine, Glucose + AGP	<b>77%</b>	23%

**In this study:**

- Fructosamine was negative in **76%** of the abnormal hemoglobin A1c samples.
- Glucose plus fructosamine failed to identify **60%** percent of hemoglobin A1c positive samples.
- AGP in combination with fructosamine and glucose correctly identified **77%** of applicants who were hemoglobin A1c positive.

**Conclusion:**

AGP is a sensitive and specific marker for identifying diabetic applicants. While AGP can be used effectively as a general screening test in conjunction with fructosamine values greater than 2.1mg/dL and serum glucose values greater than 109 mg/dl, we recommend it as a routine test on all applicants. Hemoglobin A1c testing will still be used for final confirmation, but the effectiveness of this new test will deliver more accurate assessment in the general population and diabetic results that more closely mirror the increases seen in the general population.