

Underwriters ask — to fast or not to fast?

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Introduction

One of the most difficult calls facing an underwriter is the discussion with a producer who insists that his client has been unfairly rated due to an improper fasting time prior to blood drawing. The producer will argue that the cholesterol level of 350 mg/dL would be greatly reduced if the examiner had not shown up one hour early for the exam. The underwriter knows that repeating the test may be inconvenient for the applicant and might not change the outcome but not repeating the test might be unfair — and alienate the insurance producer.

Preparing the applicant for an insurance application exam usually includes instructions similar to those given prior to a physician check up. We advise the applicant to follow their normal routine, take their medications as usual and not partake in unusual heavy physical activity just before the exam. They are also advised to fast when blood will be drawn for analysis.

In the clinical arena, patients are usually told to not eat after 9 p.m. on the night before blood is to be drawn. That assumes that the patient will be at the doctor's office early in the morning to have the blood sample taken for laboratory analysis. This advice has generally carried over into the risk assessment profile for the issuance of life insurance. However, the majority of insurance exams are not done early in the morning, but rather fit into a schedule that is most convenient for the applicant.

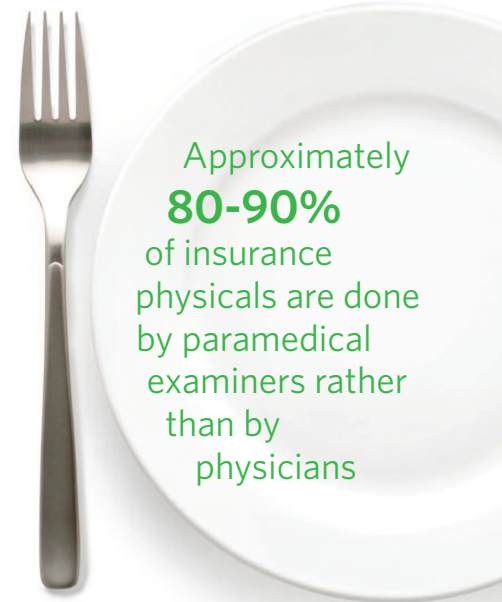
In the United States, approximately 80-90 percent of insurance physicals are done by paramedical examiners rather than by physicians.¹ Most of these exams are performed in the home or office of the proposed insured and are intended to intrude on the applicant as little as possible. Early doubts about the accuracy of information obtained at these exams have disappeared. In fact, paramedical examiners seem to have a lower tendency than physicians to edit a medical history or to round down a blood pressure reading.¹

One limitation of the paramedical insurance exam however, is the time when an applicant is available for the exam. Applicants are examined at all times of the day and evening. Over the years, an important question asked and recorded on the exam form has been the time of last meal. The underwriter can refer to this when forming a judgment about the results of laboratory tests. However, how often does the length of time of fasting before blood draw actually influence the test results we use in insurance risk assessment?

In preparing our applicants for the insurance exam we also have to remember there is an epidemic of diabetes in this country and the majority of diabetics are carrying a silent disease that has not yet been diagnosed. According to the American Diabetes Association (ADA), there were 29.1 million Americans in 2012 with diabetes — 8.1 million of those cases were undiagnosed. Proper management of diabetes includes a schedule of food intake and/or medications. It is possible that some applicants who are diabetic, whether they know it or not, might be at risk for low blood sugar episodes if they fast for several hours before an insurance exam.

Methods

In order to determine the effects of different fasting periods on the most common serum analytes used for risk assessment, data were compiled from the results sent to an ExamOne laboratory over a period of one month. The examinations were performed in 44 different states and represented applications with face amounts ranging from



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\$25,000 to \$2,500,000. Each case report contains paramedical information as well as results from blood and urine collection. The data set includes 9,657 males and 8,369 females with 9,233 cases having fasted 8 hours or less and 8,821 cases having fasted more than 8 hours. In the analysis, intervals of less than 2 hours fasting are compared with intervals of 3-4 hours, 5-8 hours, 9-12 hours and reported fasts of greater than 12 hours. The analytes chosen for review include cholesterol, HDL cholesterol, glucose, hemoglobin A1c and triglycerides.

Results

Table 1 provides demographic and physical measurement data for the applicants included in the data set. The average age for both males and females was 37 years and across all fasting intervals, the average weight for males was 195 lbs and for females was 156 lbs. Blood pressure was higher in males, but consistent across all of the time intervals. For purposes of comparison, there are no significant differences in the demographic or physical profiles of the persons in any of the intervals of time used in the analysis.

Cholesterol, HDL cholesterol, glucose and triglycerides were chosen as the analytes of interest since these are of most concern to underwriters. The average cholesterol did not change with increasing time since the last meal. HDL cholesterol was also consistent across the time intervals. Table 2 presents these results and shows that only triglycerides were higher when the fast is less than 8 hours. However, this finding was observed only in males with the average values for females remaining the same in all intervals.

To look at the impact that shorter fasting times might have on the rating of cases, we examined the percentage of cases that would exceed the usual clinical range reported by ExamOne. These upper limits are consistent with current guidelines from the National Heart, Lung and Blood Institute, the American Heart Association and the American Diabetes Association. Table 3 shows that while 39% of applicants have cholesterol levels over 200 mg/dL, there is no difference based on time since last meal. Similar results are seen for HDL cholesterol where low HDL values were seen in the same proportions regardless of fasting

time. Looking at glucose, a fast of less than 2 hours shows 7.8% of the population with values above 109mg/dL versus 4.7% when fasting was 5-8 hours. When the fast was reported to be less than 2 hours, triglyceride levels above 150 mg/dL are significantly higher when compared to the following intervals and consistently go down as the time of fasting increases.

Those individuals who reported fasting less than 2 hours were more likely to have been tested for hemoglobin A1c than those in the other intervals (6.0% versus 3.3%) possibly as a result of company specific reflex criteria. In the 0-2 hour group, 45% of those tested had HbA1c greater than 6.0%. This value increased to 60%, 64%, 72% and 75% in subsequent time intervals.

Discussion

Several clinical studies have looked at the effects of fasting on serum analytes.² Fasting is associated with elevations in bilirubin and prolonged fasts (greater than 72 hours) have been reported to increase triglycerides, glycerol and free fatty acids.² However, most of the clinical studies quoted in the literature were conducted with older methods of analysis than are currently in use in U.S. insurance testing laboratories.

In 1984, the National Cholesterol Education Program advised Americans to “Know Their Cholesterol” and if necessary, reduce it to appropriate levels.³ Population screenings were organized at workplaces, in shopping malls and in supermarkets.⁴ These point of care tests conducted outside of the usual laboratory environment were initially subject to much criticism due to failure to control for fasting state. However, intense work by manufacturers of diagnostic reagents as well as by regulatory agencies demonstrated the validity of these population based tests as well as their importance in evaluating risk of cardiovascular disease.⁵ These random collection times in population screenings are similar to the times when bloods are collected for insurance application requirements.

Cholesterol testing methods evolved in the 1970s from chemical methods in which lipemia or hemolysis could invalidate the results. The methods now in use in our laboratories are enzymatic in nature and forestall the interferences seen when lipemia is present. The accuracy of measurements obtained in the postprandial state has been greatly improved by these new methods. Several studies were conducted to check on the validity of the measurements obtained in population screenings and their linearity in the clinical laboratory. One study that provided a major challenge involved cholesterol measurements in healthy volunteers both before and after the consumption of high fat, high carbohydrate “super sized” meals at fast food restaurants. The results of this true to life study demonstrated that severe lipemia and increased triglycerides has minimal effect on serum cholesterol and on HDL cholesterol.⁶

The results from the ExamOne database confirm the validity of using cholesterol results on applicants who have not fasted overnight. In fact, there is not a significant advantage to a traditional fasting period prior to the insurance application physical. The same holds true for HDL cholesterol across the hours since last meal and for both men and women. Therefore, HDL/cholesterol ratio, which is so important for underwriters, is not affected by fasting state.

Non-fasting LDL cholesterol has similar prognostic value as that of fasting LDL cholesterol. National and international agencies should consider re-evaluating the recommendation that patients fast before obtaining a lipid panel.⁷

In the past, triglyceride levels have not received much attention in insurance underwriting and in fact, have been ignored by many companies in the underwriting process. However, increased knowledge of the risk factors for metabolic syndrome has drawn more concern about elevated fasting triglyceride levels especially when present in conjunction with insulin resistance, abdominal obesity and hypertension.⁸ Persons presenting with metabolic syndrome are at increased risk for cardiovascular disease and diabetes mellitus. Analysis of our data shows that when applicants fast for less than 8 hours, over 40% have triglyceride levels greater than 150 mg/dL. However, this is seen predominantly in males while the cardiovascular risk presented with elevated triglycerides is believed to be significant in females.^{9,10}

Metabolic syndrome is not diagnosed by elevated triglycerides alone. It is a combination of factors that present the elevated risk for cardiovascular disease. In this data set and across all time intervals, the vast majority of those applicants whose triglyceride levels were greater than the 95th percentile also had higher than normal glucose or cholesterol levels or low HDL cholesterol levels. While not significant, systolic blood pressure also tended to be higher in these subsets of applicants found with the very high triglyceride levels. Thus, those proposed insureds with very high triglycerides could be identified to be at risk for metabolic syndrome due to the constellation of risk factors they present.

The use of blood glucose tests has changed dramatically in insurance testing over the years. Until the mid to late 1980s, elevated blood glucose might have been followed up with the equivalent of a 2 hour glucose tolerance test termed Blood Sugar After Glucose. This test required a second visit to

TABLE 1: PHYSICAL DATA

INTERVAL OF FASTING		AVG.TIME HOURS	AGE YRS	WEIGHT	DIASTOLIC BP	SYSTOLIC BP	PULSE
0-2 hours	Males	0.7	38	195	74	120	74
	Females	0.7	36	157	70	111	70
3-4 hours	Males	3.6	38	194	75	120	70
	Females	3.6	37	157	70	111	69
5-8 hours	Males	6.1	37	195	76	120	68
	Females	6.1	36	156	71	112	69
9-12 hours	Males	10.9	38	195	76	119	68
	Females	11.1	39	153	70	110	68

TABLE 2: AVERAGE VALUES

TIME SINCE LAST MEAL		CHOLESTEROL MG/DL	GLUCOSE MG/DL	HDL CHOL MG/DL	TRIGLYCERIDES MG/DL
0-2 hours	Males	196	93	48	210
	Females	189	88	60	142
3-4 hours	Males	198	89	48	224
	Females	190	83	60	146
5-8 hours	Males	198	86	49	200
	Females	189	82	60	126
9-12 hours	Males	196	90	49	160
	Females	189	84	60	107
> 12 hours	Males	200	89	50	153
	Females	189	85	60	110

TABLE 3: VALUES PERCENTAGE OUTSIDE THE USUAL CLINICAL RANGE

TIME SINCE LAST MEAL	CHOLESTEROL >200MG/DL	GLUCOSE >109MG/DL	HDL CHOL <36MG/DL	TRIGLYCERIDES >150MG/DL
0-2 hours	38.6	7.8	7.8	55.6
3-4 hours	39.1	5.9	5.7	47.8
5-8 hours	41.1	4.7	7.1	40.7
9-12 hours	38.7	6.1	6.1	28.7
>12 hours	41.1	5.4	5.7	27.1

the applicant, administration of an oral sugar solution and another blood draw. Today, the inclusion of the hemoglobin A1c test in the insurance laboratory profile provides a much improved tool for evaluating the most accurate representation of the applicant's long-term glucose control. A1c is the ADA's recommended diagnostic test for diabetes and the test is not affected by any delays in specimen processing. The A1c test minimizes the inconvenience to the applicant of another visit and blood draw, due to any fasting concerns.

The increase in diabetes in our population has reached epidemic proportions due to obesity, inactivity and poor lifestyle choices.¹¹ Many cases of diabetes are actually first detected at an insurance exam when blood results for glucose and/or hemoglobin A1c are found to be outside the acceptable range. The data used in this analysis document higher blood glucose when the applicants have not fasted. Also, the number of hemoglobin A1c measurements was greater in the non-fasting state due to reflex testing and/or possible knowledge of pre-existing diabetes in these persons. While a fast of at least 2 hours will provide a more representative blood glucose reading, the hemoglobin A1c measurement is more reliable for determination of long term glucose control. Shorter fasting times can also reduce the possibility of inadvertent low blood sugar reactions in persons who do not realize they have diabetes or in those who are attempting to avoid disclosure of an existing diabetic condition.

Conclusion

With the inclusion of A1c in our standard test profile, the underwriter can safely rely on the accuracy of results received from the insurance application physical even when the applicant has not fasted overnight.

It is most important that the exam be convenient for the applicant as well as provides data which is useful for underwriting.

For more information, visit ExamOne.com.

THE DATA: STATS BEHIND THE STUDY

1 month of applicant results

Performed in 44 states

Application face amounts ranging from \$25,000 to \$2,500,000

Paramedical information and results from blood and urine collection

9,657 males

8,369 females

9,233 cases having fasted 8 hours or less

8,821 cases having fasted more than 8 hours

The analytes chosen for review include cholesterol, HDL cholesterol, glucose, hemoglobin A1c and triglycerides



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