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A New Alcohol Marker For Life Insurance Underwriting

A Commonsense Guide For Using
Phosphatidylethanol (PEth)

White Paper – September 2025

Optimum Re Life Research and Development –
Biometric Risk



Summary

Phosphatidylethanol (PEth) is a direct and highly specific biomarker for detecting alcohol consumption—unlike carbohydrate deficient transferrin (CDT) which is an indirect marker susceptible to false-positive results or genetic factors. Alcoholic beverages are composed of ethanol, water, sugars, flavorings, and small amounts of methanol. PEth forms on the surface of the red blood cells when a person consumes ethanol, so it differs from alcohol’s effect on the liver that affect liver enzymes and other liver tests. PEth is not affected by liver disease, medications, or casual environmental exposure to alcohol (e.g., hand sanitizers or wipes). Over 99% of ethanol is metabolized to acetaldehyde (a toxic metabolite) and acetate through an oxidative process. However, the tiny portion of alcohol that is metabolized to PEth by non-oxidative means is an ideal alcohol marker that reflects prior alcohol intake.

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How Does It Work

PEth is created on the highly active surface of the red blood cell membrane when ethanol in the bloodstream displaces the choline portion of phosphatidylcholine to form phosphatidylethanol (PEth). Even modest alcohol intake produces detectable levels of PEth which may remain in the blood for up to 4 weeks after the last alcoholic beverage. The more someone drinks alcohol, the higher the PEth level. Both regular alcohol intake and sporadic binge drinking will raise the PEth level.

Why Use It In Underwriting

Sensitive & Specific: Unlike liver enzyme tests which can be elevated by a myriad of causes, or CDT which is subject to false-positives, PEth is only elevated with alcohol consumption, strengthening underwriting accuracy.

Longer Detection Window: The blood alcohol level disappears in hours, but PEth provides a retrospective view of alcohol use over several weeks.

A New Weapon To Counter Applicant Underreporting Of Alcohol Intake: Questions regarding alcohol use on life insurance applications or alcohol questionnaires are often met with a lack of candor by applicants. PEth can clearly identify underreporting of alcohol intake on riskier applicants.

Objective And Quantitative: PEth levels correlate with the volume and frequency of alcohol intake; higher PEth level = higher risk. PEth helps to stratify moderate, heavy, and problematic alcohol drinkers for more informed pricing and risk classification.

Tips For Using PEth Levels In Underwriting

Analytic Thresholds: Most labs use a PEth threshold to flag “concerning” drinking. PEth levels less than 20 ng/ml are associated with abstinence; levels of 20 ng/ml to approximately 200 ng/ml indicates moderate drinking (215 ng/ml is unofficially called “the Swedish Cut-off”), and higher PEth levels indicate heavy or worrisome alcohol intake.

No False Positives: Hand sanitizers, alcohol wipes for blood draws, and working in a bar don’t contribute to a rise in PEth levels—only drinking alcohol does.

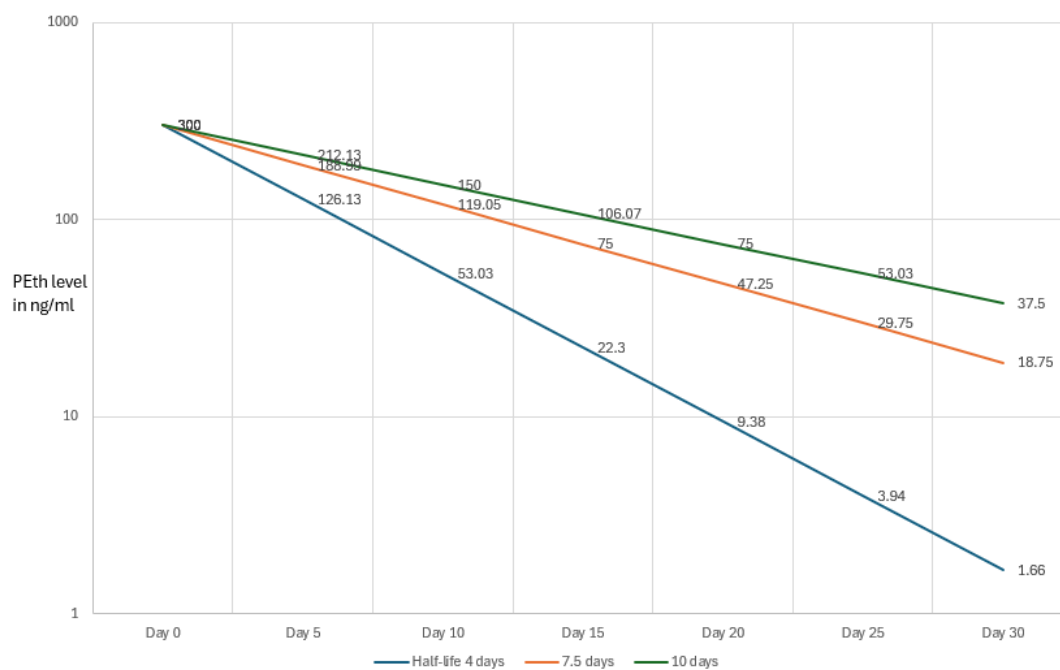
Half-Life Of PEth: Generally, PEth demonstrates the level of alcohol intake over the last month, allowing for a robust detection of drinking alcohol. The half-life of PEth varies in individuals between 4.0 to 10 days. The half-life can vary somewhat within an individual depending on other metabolic variables. The first week after drinking alcohol, the half-life may be 6 days, but due to some external or endogenous metabolic factor the half-life may modulate to 6.5 or 7 days in the second week after drinking. It may be useful to consider the half-life to be subject to a range of half-lives, or a “corridor”, with subtle variability. The chart below shows the PEth level at 300 ng/ml on day zero after prior alcohol intake with the PEth level decreasing at 3 different half-lives: 4 days, 7.5 days, and 10 days.



Rate Of Metabolism Of A PEth Level Of 300 ng/ml At 3 Different Half-lives

Day	Half-life 4 days	Half-life 7 days	Half-life 10 days
0	300.00	300.00	300.00
5	126.13	188.99	212.13
10	53.03	119.06	150.00
15	22.30	75.00	106.07
20	9.38	47.25	75.00
25	3.94	29.76	53.03
30	1.66	18.75	37.50

PEth Rate Of Metabolism Semi-Log Scale



Practical Considerations

Collection: A standard blood draw is used to collect the blood sample. In Europe, dried blood spot PEth testing is available which may lower pre-analytic handling or delay issues.

Cost: The PEth test is more expensive than routine blood tests, but the additional risk insight often justifies the expense on large face-amount or high-risk cases.

Bottom Line

PEth is a valuable new tool for modern life insurance underwriting. It objectively detects on-going or high-risk drinking behaviors that are missed by alcohol questionnaires or traditional lab tests. Used thoughtfully in conjunction with the applicant history, and conventional lab tests, PEth improves risk stratification, helps avoid early claims, and supports more competitive pricing.



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Our mission is to support clients of all sizes by providing expertise and solutions in addition to reinsurance capacity. Year after year, we continue to successfully expand our presence in the market through organic growth, block acquisitions, and personalized solutions tailored to increase market share for our clients.

Optimum Life Reinsurance is the reinsurer of choice for more than 160 life insurance companies in the US and Caribbean markets.

About Optimum Financial Group

Optimum Financial Group is dedicated to the financial security of its clients since 1969. Global and privately-owned, it is active in the sectors of actuarial consulting, global asset management, general insurance, information technology, life insurance, life reinsurance, and real estate. The Group has over 700 employees within diverse subsidiaries operating in 20 business places in Canada, the United States and in France. Its revenues are nearly 1.4 billion Canadian dollars, its assets under management in Canada, the United States and in France totalise 8.4 billion Canadian dollars and its total assets rise up to nearly 6 billion Canadian dollars.

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