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Concordance Between the Alcohol Use Disorders Identification Test and Phosphatidylethanol: A Narrative Review

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ABSTRACT

Aims: To evaluate the concordance between the Alcohol Use Disorders Identification Test (AUDIT) and phosphatidylethanol (PEth) as measures of alcohol consumption.

Methods: Narrative review of studies assessing associations between the full 10-item AUDIT and PEth. Evidence was synthesized with emphasis on correlation, agreement, and sources of discordance.

Results: Across clinical and population-based studies, correlations between AUDIT and PEth are consistently moderate ($r \approx 0.50–0.65$). A meta-analytic approximation yields a pooled correlation of $r \approx 0.57$. Despite this association, discordance is observed in approximately 20–30% of individuals. Elevated PEth with low AUDIT scores suggests underreporting, whereas high AUDIT with low PEth reflects differences in timeframe or construct.

Conclusions: AUDIT and PEth capture related but distinct dimensions of alcohol use. Their moderate concordance reflects differences in behavioral versus biochemical measurement. Combined use improves detection of alcohol consumption and should be considered in clinical and research settings.

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Introduction

Assessment of alcohol consumption remains methodologically challenging due to the lack of a single gold standard [1]. The AUDIT is one of the most widely used screening tools for identifying hazardous and harmful alcohol use [2]. The AUDIT is a comprehensive behavioral screening instrument designed to identify hazardous and harmful drinking, as well as symptoms of alcohol dependence [14]. Its principal advantage lies in its ability to capture patterns of use, psychosocial consequences, and risk behaviors [17]. As such, it provides clinically actionable information relevant to diagnosis, risk stratification, and treatment planning [16]. Additionally, the AUDIT is inexpensive, easy to administer, and widely validated across diverse populations [20]. Despite its widespread use, the AUDIT relies on self-report and is therefore subject to recall bias, social desirability bias, and intentional underreporting [4]. These limitations are particularly relevant in clinical contexts where disclosure may have perceived consequences, such as addiction treatment, transplantation, or pregnancy care [5].

Biochemical markers of alcohol consumption offer an objective alternative [3,7,12]. Among these, Phosphatidylethanol (PEth) has gained prominence due to its high specificity for ethanol exposure [9]. PEth is a phospholipid formed in cell membranes only in the presence of ethanol, reflecting cumulative alcohol exposure over approximately 23 weeks [13]. Unlike indirect biomarkers, PEth is not influenced by liver disease or other non-alcohol-related conditions, making it particularly useful for detecting recent alcohol use [19].

Its independence from self-report makes it particularly valuable for detecting unreported or underestimated alcohol use. PEth is therefore well suited for contexts requiring verification of abstinence or recent consumption, such as transplant evaluation, monitoring in addiction treatment, or pregnancy care [6]. Nevertheless, PEth does not provide information on dependence, drinking patterns beyond its detection window, or alcohol-related harm, limiting its interpretive scope when used in isolation [12].

The AUDIT and PEth assess fundamentally different constructs. The AUDIT captures behavioral patterns and consequences of alcohol use over extended periods, whereas PEth reflects recent biochemical exposure. Understanding the concordance between these measures is essential for determining whether they can be used interchangeably or should be applied in a complementary manner.

This review synthesizes the available literature on the relationship between the full AUDIT and PEth, focusing on correlation, agreement, and determinants of discordance.

Methods

A narrative review approach was used. Relevant studies were

identified through searches of PubMed, Embase, and Scopus using combinations of the terms "AUDIT," "phosphatidylethanol," and "alcohol biomarker." Inclusion criteria were: use of the full 10-item AUDIT, quantitative measurement of PEth, reporting of correlation or association between measures. Data extracted included study population, sample size, correlation coefficients, and applied cutoffs. Given heterogeneity in study design and reporting, a meta-analytic approximation was performed using Fisher z-transformed correlations with inverse-variance weighting.

Results

References list of included in this review articles is presented in table 1. Across clinical and population-based studies, correlations between AUDIT and PEth are consistently moderate ($r \approx 0.50–0.65$). A meta-analytic approximation yields a pooled correlation of $r \approx 0.57$ (95% CI 0.51–0.62), indicating a stable relationship between self-reported alcohol use and biomarker-derived exposure. This pattern was observed across heterogeneous populations, including psychiatric cohorts, pregnant individuals, and mixed clinical samples. Correlation strength varies by population: higher in heavy drinkers and clinical samples, lower in heterogeneous or moderate-drinking populations. Despite moderate correlation, agreement between AUDIT and PEth classifications is limited. Approximately 20–30% of individuals demonstrate discordant results. The moderate correlation observed across studies is visually summarized in Figure 1, which demonstrates a relatively narrow range of effect sizes despite differences in study populations. Notably, the overlap in confidence intervals suggests that variability in correlation is driven more by population characteristics and drinking patterns than by methodological inconsistency. The pooled estimate reinforces that, while AUDIT and PEth are clearly related, a substantial proportion of variance remains unexplained, consistent with their differing conceptual foundations.

Table 1: Comparison of the AUDIT Test Results and Concentrations of PEth in Blood Quantitative Findings

Authors/Year	Population	Samle size	Correlation
Finanger et all., 2022	patients of acute psychiatric department	177	0.63
Verheij et all. 2022	Emergency Departmen patients	301	0.67
Lee et al. 2025	young adults binge drinkers.	58	0.745
Thurfjell et al. 2026	hypertensive primary care patients	270	0.59
Afshar et al. 2017	patients from intensive care units and alcohol detoxification unit	122	0.52
Cherrier et al., 2020	sample of community-dwelling older to middle-age adults	183	0.58
Hasken et al., 2023	pregnant women	222	0.52
Kuteesa et al. 2019	residents of fishing communities		0,59
Lundholm et al. 2026	psychiatric outpatients	4063	pseudo-$R^2 = 30$
Meredith et al. 2025	youth with minimal or heavy alcohol use	78	0.37
Sonmez et al. 2017	alcohol-dependent patients	22	0.27
Stewart et al., 2014	liver disease patients	222	0.35
Piano et al., 2015	alcohol-dependent individuals	103	0.17
Herrera et al., 2017	men who have sex with men and transgender women	86	low
Razvodovsky & Schuriberco, 2024	men recruted from general population	136	no

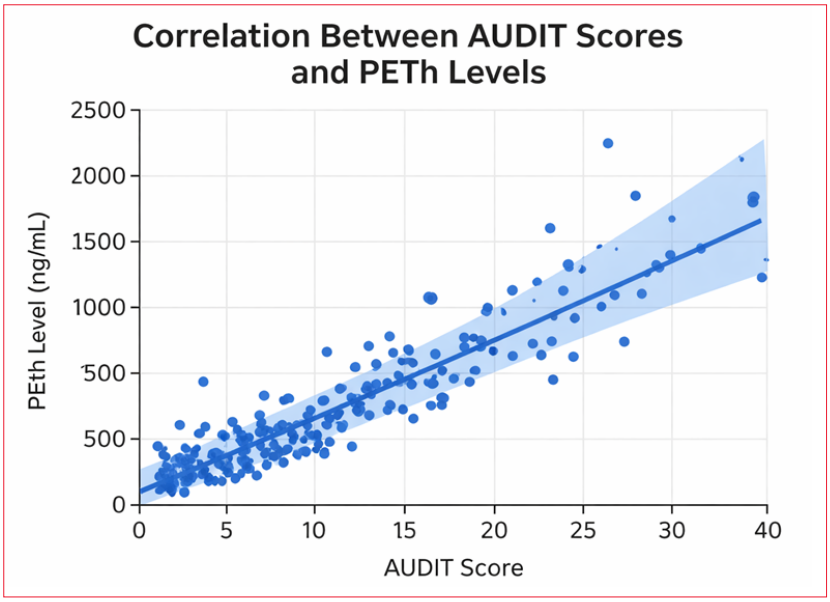

Figure 1: A Plot of Correlations Between the Alcohol Use Disorders Identification Test (AUDIT) and Phosphatidylethanol (PEth)

Discussion

Across studies using the full AUDIT, the association with PEth is consistently reported as moderate, indicating a clear but incomplete relationship between self-reported alcohol use and biomarker-derived estimates of recent consumption. These findings are broadly consistent across diverse populations, including psychiatric patients, pregnant individuals, and mixed clinical cohorts. A critical insight from the literature is that correlation does not imply agreement [5]. Despite moderate correlation coefficients, a substantial proportion of individuals demonstrate discordant results when assessed with AUDIT and PEth. Studies consistently report that approximately 20–30% of cases fall into discrepant categories [12].

Two primary patterns of discordance are observed. First, individuals with elevated PEth concentrations but low or moderate AUDIT scores likely represent cases of underreported alcohol consumption. This discrepancy highlights the susceptibility of self-report measures to social desirability and recall biases [4]. Second, individuals with high AUDIT scores but low PEth levels may reflect past heavy drinking, alcohol-related harm independent of current intake, or episodic consumption occurring outside the biomarker's detection window. These findings underscore that AUDIT and PEth are not interchangeable measures and should not be expected to yield identical classifications.

Several mechanisms contribute systematically to the observed divergence between behavioral and biochemical measures:

1. **Differences in Measurement Constructs:** The AUDIT captures a composite of consumption, dependence, and harm, whereas PEth reflects only recent ethanol exposure. This fundamental difference introduces structural limits to concordance [15,20].
2. **Timeframe Mismatch:** PEth reflects alcohol intake over the prior 2–3 weeks, while the AUDIT typically assesses patterns over months or longer. Consequently, recent changes in drinking behavior may be detected by PEth but not fully captured by the AUDIT [2,9].
3. **Self-Report Bias:** Underreporting of alcohol use remains a well-documented phenomenon, particularly in stigmatized or high-risk contexts. PEth frequently identifies alcohol exposure in individuals who deny or minimize consumption on questionnaires [15].
4. **Variability in Drinking Patterns:** Chronic heavy drinking is more likely to produce concordant elevations in both AUDIT and PEth, whereas intermittent or binge drinking may lead to inconsistent alignment depending on timing [11,14].
5. **Biological Variability:** Inter-individual differences in PEth formation and elimination may further contribute to variability, although these effects are generally smaller than behavioral factors [8,18].

The moderate correlation and frequent discordance between AUDIT and PEth have important clinical implications. From a diagnostic perspective, the two measures exhibit complementary strengths. The AUDIT demonstrates greater utility for identifying individuals at risk of alcohol use disorders and for guiding behavioral interventions, whereas PEth is more effective in confirming recent alcohol exposure and identifying discrepancies in self-report. Neither measure alone provides a complete assessment: the AUDIT may underestimate consumption due to reporting bias, while PEth may fail to capture clinically significant patterns of harmful use outside its temporal window.

The comparative utility of these tools is therefore context-dependent. In primary care and population screening, the AUDIT remains an appropriate first-line instrument due to its feasibility and breadth. In contrast, PEth is particularly valuable in high-stakes or high-risk settings where objective verification is required. In specialized clinical environments, such as addiction medicine or transplant programs, the integration of both measures offers clear advantages.

Importantly, the moderate concordance between AUDIT and PEth should not be interpreted as a limitation of either tool, but rather as a reflection of their distinct measurement domains. When used together, they provide a more comprehensive assessment by combining behavioral insight with biochemical confirmation. This complementary approach enhances diagnostic accuracy, improves detection of underreported alcohol use, and supports more informed clinical decision-making.

Taken together, the evidence supports a complementary rather than substitutive use of these tools. Combining behavioral assessment with biomarker data enhances detection of unreported drinking, improves diagnostic accuracy, and provides a more comprehensive understanding of alcohol use. This integrated approach is particularly beneficial in contexts where accurate reporting is critical, such as monitoring abstinence, evaluating treatment response, or assessing eligibility for medical interventions.

The available evidence is subject to several limitations. Studies using the full AUDIT are fewer in number compared to those employing abbreviated versions, and sample sizes are often modest. There is also heterogeneity in PEth thresholds and laboratory methods, complicating direct comparisons across studies. Furthermore, relatively few investigations employ formal agreement analyses, such as Bland–Altman methods, limiting insight into systematic bias.

Conclusion

The relationship between the AUDIT and PEth is characterized by moderate correlation but substantial and clinically meaningful discordance. These findings reflect fundamental differences in what each measure captures -behavioral patterns versus biochemical exposure. As such, AUDIT and PEth should be viewed as complementary tools, and their combined use offers a more robust framework for assessing alcohol consumption than either measure alone. Their combined use represents a pragmatic and evidence-based strategy for optimizing the assessment of alcohol consumption across a range of clinical settings.

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