Transdermal Alcohol Measurement: A Review of the Literature

Jeff Hawthorne* and Mark Wojcik
Alcohol Monitoring Systems, Inc., Highlands Ranch, CO, USA

The body of scientific literature on transdermal alcohol testing dates back almost 70 years. The first viable method enabling this knowledge appeared in the 1980s in the form of an alcohol “sweat-patch.” Alcohol testing by transdermal (i.e., through the skin) methods is relatively unknown compared to blood, breath, or urine testing. Over the past several years, products that use transdermal alcohol measurement to screen for alcohol consumption and estimate Blood Alcohol Concentration have appeared in the marketplace.

Researchers have performed significant transdermal alcohol measurement research utilizing a number of different research techniques with very consistent results. Based on the published literature, one must conclude that: (1) ethanol is excreted through the skin in sufficient quantities to estimate Blood Alcohol Concentration (BAC); (2) those who have not consumed alcohol do not produce signals that can be interpreted as a transdermal alcohol curve; (3) Transdermal Alcohol Concentration (TAC) is correlated with BAC in both magnitude and shape of the alcohol curve; (4) the TAC alcohol curve is right shifted from the BrAC alcohol curve and takes longer to reach zero; and (5) measuring TAC on a constant basis provides an effective screen for alcohol consumption and an approximation of the magnitude of that consumption. The variability in the kinetics of ethanol transport through the stratum corneum and the variations between peak values of BAC and TAC dictate that today’s transdermal devices cannot directly replace a breath analyzer, but can semi-quantitatively identify drinking episodes in a continuous screening environment. Further research and improved modeling techniques of ethanol transport through the skin are required to obtain more quantitatively accurate transdermal results.

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