

URINE DRUG TEST INFORMATION SHEET

NICOTINE/COTININE

Classification: Stimulant

Background: Nicotine is a drug to which virtually every member of a tobacco-using society is exposed. Although cotinine (the metabolite of nicotine) is often detected in the urine of nonsmokers, the level of urinary cotinine can still be used to differentiate smokers from nonsmokers who have been exposed to secondhand tobacco smoke.

Legal Use: Although use of tobacco is legal in the U.S., its sale to minors is prohibited.

Modes of Use: Tobacco is normally smoked or chewed, but nicotine can also be absorbed through the skin.

Appearance: Leafy plant

Metabolism and Detection Time in Urine: In the body nicotine is rapidly converted to cotinine, which is subsequently eliminated in the urine. Only a small fraction of the parent nicotine is eliminated in the urine, and its detection time following use is short compared to cotinine. The presence of cotinine is accepted evidence of nicotine use and can be detected in the urine for as long as 2–5 days after use.

Bodily Effects: Desirable effects of nicotine include stimulation and a sense of well-being. Prolonged use can lead to physical dependency.

Cutoff Levels: 500 ng/mL

Interpretation of Results: A urine cotinine level greater than 500 ng/mL indicates recent nicotine use. Studies have shown that although nicotine can be absorbed from secondhand smoke, second-hand smoke is not sufficient to cause a cotinine level greater than 500 ng/mg. Conversely, levels between 100–500 ng/mL indicate infrequent smoking or intense exposure to secondhand smoke. Finally, a cotinine level less than 100 ng/mL indicates very little exposure to nicotine.

Review:

A group of nonsmokers had urine cotinine levels between 0–64 ng/mg. After staying in a smoky room for 80 minutes their levels were between 13–200 ng/mg. Daily smokers had urine cotinine levels between 1000–20,000 ng/mg.¹

The manufacturer of testing reagents recommends the use of a 500 ng/mg cutoff to indicate chronic smokers.²

The authors of a study of 211 people attending a cardiovascular clinic reported that a 50 ng/mg cutoff could discriminate smokers from nonsmokers.³

References:

1. R.C. Baselt. Disposition of Toxic Drugs and Chemicals in Man, Tenth Edition. (2014) Biomedical Publications, Seal Beach, CA.
2. Cotinine Enzyme Immunoassay, Diagnostic Reagents, INC, (1996), Sunnyvale, CA.
3. M.J. Jarvis, Hugh Tunstall-Pedoe, C. Feyerabend, C. Vesey, and Y. Saloojee. "Comparison of tests used to distinguish smokers from nonsmokers," American Journal of Public Health, (1987), 77, pp. 1435–1438.

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