SDRL Laboratory

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Utilizing the THC/Creatinine Ratio (part 1)

Marijuana is a fat soluble drug with a long plasma half life. This leads to confusion in interpretation when urine samples are collected at different times. If a patient ceased using marijuana, one would expect that the values for THC would drop as different samples are collected. However, when the urine is dilute or concentrated, the THC values will become higher or lower dependent on the dilution of the urine.

The absence of THC in a urine sample is very good evidence that a person is not continuing the use of the drug. To achieve this absence in a chronic marijuana user can take up to 30 days after the use of the drug has been discontinued. During this period of time, monitoring the urine values (levels) for THC concentration can lead to confusing results, and often times the values obtained are quite unusable.

In some samples, the variability of the urine concentration results can range from being very concentrated (such as the first void in the morning) to very dilute (when a person drinks a lot of water or other beverages). Lifestyle can also affect the urine composition. The main issue with THC is that it is extremely insoluble in water samples and very soluble in organic media, which is to say, the drug is stored in the human body in fat tissue. This storage is a function of the length of use of the drug, the amount of the dose and the frequency of daily use. The storage of the drug under these chronic conditions results in a slow elimination. When the variability of the urine concentration is also factored in, the resulting elimination of the drug can fluctuate quite a bite from sample to sample and day to day.

To compensate for this fluctuation in urine concentration, a creatinine value can be used. Creatinine values are utilized in a qualitative sense to state that urine samples have either been diluted with fluids (most commonly water) or that excess beverage consumption has resulted in voiding a diluted sample. However, by using the analytical value determined for creatinine and adjusting the units of measure so that a comparison between the THC and creatinine values can be made, it is possible to obtain an informed opinion as to weather or not a serial urine sample is higher or lower in THC.

Creatinine is a natural compound that is produced in the body and excreted in the urine in relatively constant amounts on a daily basis. The amount excreted by each individual is about 1 to 1.2 grams/day. Because creatinine is excreted from the body at a constant rate, there are expected creatinine values in normal human urine. However, the amount found for creatinine in each voided specimen when added up will result in a value of 1 to 1.2 grams. Thus, a diluted sample will have less creatinine and less THC in it. The ratio will then correct for this variability in the urine volume.

***Part 2 of this article will appear in the February issue of* Toxicology Times.**

??? Did You Know ???

According to the Substance Abuse and Mental Health Services Administration (SAMHSA) *2010 National Survey on Drug Use and Health: Summary of National Findings*, 22.6 million Americans aged 12 or older were current (within the past month) illicit drug users. This estimate represents 8.9 percent of the population aged 12 or older. "Illicit drugs" include marijuana/hashish, cocaine (including crack), heroin, hallucinogens, inhalants or prescription-type psychotherapeutics used nonmedically. The overall rate of current illicit drug use among persons aged 12 or older in 2010 (8.9 percent) was similar to the rate in 2009 (8.7 percent), but it was higher than rates seen in previous years. Free copies of this report can be downloaded from the SAMHSA web site by visiting http://store.samhsa.gov/home.

Question of the Month

Question: *Is it true that propoxyphene (PPX) is no longer available in the United States? Should we still be testing our patients for it?*

Answer: In November of 2010, the U.S. Food and Drug Administration asked manufacturers of propoxyphene and propoxyphene-containing products – including generic products – to discontinue production and remove the drugs from the U.S. market due to potential cardiac complications. Additionally, the FDA advised healthcare providers to stop prescribing the drug to patients. It's always a good idea to review your drug panel from time to time to make sure it still matches your programs' goals and your patients' needs. If Propoxyphene is no longer of importance to your program and it is on your drug-testing panel, you might consider removing the drug as it is most likely a factor in your drug screen price.