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Laboratory Drug-Testing Terminology 101 (part 2)

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Cutoff Level – a cutoff level represents a numeric definition at which the concentration of a drug or its metabolites found in a sample will yield a Positive or Negative result. A sample testing at or above the stated cut off value for a certain drug is Positive; a sample testing below the stated cut off value is Negative. It is possible for small amounts of a drug to be present in a sample but the result to still be Negative if the amount detected is less than the cutoff value. Cutoff values are typically determined by the program or state requirements and vary from class to class. Laboratories can adjust cutoff levels as requested by the client. A typical cutoff level on an Immunoassay screen for the Opiates class is 300 ng/mL, while the cutoff for THC (Cannabinoids) by this same method is typically 50 ng/mL. Cutoff levels vary between test type. An immunoassay test will have a higher cutoff level as it is looking for more broad information, whereas a confirmation will have a lower cutoff level as it is looking for more specific information to identify and quantify the target analyte.

Metabolites – after a drug has been consumed, it circulates throughout the body via the bloodstream. As the drug passes through the liver, a portion is chemically altered by enzymes into compounds called metabolites. The metabolites are then excreted by the body, primarily through urine but also through other body fluids such as saliva and sweat. The presence of metabolites in a patient sample is the primary indicator of drug use, and many reagents (the chemical substances used by laboratories to detect and measure the presence of illicit or prescription drugs) are designed to look not for the parent drug but rather for the metabolite. When testing for Cocaine use, the parent drug (Cocaine) is not targeted; rather the reagent specifically looks for Cocaine's metabolite, Benzoylecgonine.

Specimen Validity Testing – specimen validity testing is performed on a urine sample to help determine if it has been diluted, adulterated or substituted. Some simple validity tests – such as visual, temperature and smell – can be performed immediately post void by the sample collector. But more sophisticated specimen validity testing can be ordered from a laboratory to test a sample for creatinine, specific gravity, nitrites, Glutaraldehyde, pH, Pyridinium Chlorochromate and bleach.

Window of Detection – the period of time after a drug has been ingested in which the primary drug and/or its metabolites can be detected in the sample. In general, the window of detection for most drugs is 48-96 hours from use in urine and 1-48 hours from use in saliva or blood.

Cross-reactivity – in drug-testing, cross-reactivity refers to the chemical reaction that occurs between a reagent and a foreign substance that is not specifically being tested for. For example, if a large amount of cold medicine is present in a patient's system, the medication can cross-react with the Amphetamines screening reagent and produce a Positive Amphetamines class result. A subsequent confirmation test would reveal the true cause of the Positive result. Cross-reactivity occurs because there is a similar molecular structure between the drug being tested for and the foreign substance.

Drug Half-Life – the time, after consumption of a drug, in which 50% of the drug is metabolized into a non-useful form by the body. As an example, the range of a half-life of Methadone is 15-24 hours. If a patient is taking an 80 mg/day dose, after 15-24 hours, 40 mg of that dose has been metabolized into a non-useful form. The half-life of a drug affects the window of detection for that compound. A shorter half-life means the drug is eliminated from the body faster.

??? Did You Know ???

SAMHSA's recently published "TEDS Report" examined the characteristics of rural and urban admissions at substance abuse treatment entry across the country. Among its findings: Rural admissions were younger and less racially and ethnically diverse than urban admissions; rural admissions were more likely than urban admissions to report primary abuse of alcohol (49.5% vs. 36.1%) or non-heroin opiates (10.6% vs. 4%); urban admissions were more likely than rural admissions to report primary abuse of heroin (21.8% vs. 3.1%) or cocaine (11.9% vs. 5.6%); and rural admissions were more likely than urban admissions to be referred by the criminal justice system (51.6% vs. 28.4%) and less likely to be self- or individually referred (22.8% vs. 38.7%). (**Source: www.samhsa.gov)**

Question of the Month

Question: *Why are different cutoff levels used for urine and saliva testing?*

Answer: The body processes and eliminates urine differently than it does saliva. Urine is stored in the bladder until a person voids; which is on average about 4x per day. Between urine voids, urine is still produced, which further concentrates in the bladder. The accumulation and concentration of the drug are the reasons that the cutoffs are set higher for urine drug testing. Saliva, on the other hand, is constantly being produced and eliminated by means of swallowing, eating or spitting. Therefore, saliva concentrations for drugs are found to be much lower. Saliva cutoffs are similar to blood cutoffs as they are both at constant rates of absorption and elimination.