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The following is taken from the "Drug Court Practitioner Fact Sheet – Urine Drug Concentrations: The Scientific Rationale for Eliminating the Use of Drug Test Levels in Drug Court Proceedings," for the complete fact sheet visit www.ndci.org.

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Introduction

While urine drug testing remains the primary strategy for the abstinence monitoring of drug court participants, interpretation of test results continues to be problematic for many courts. The use of urine drug concentrations (numeric values given with positive results) for the purpose of interpretation remains widespread. Many drug courts utilize urinary drug levels in an attempt to quantify the drug use behavior and patterns of their client population. To make matters worse, absolute drug concentrations are often "interpreted" without adjustments for differences in urine water content. Increases in absolute drug concentrations resulting from changes in urinary output are often mistakenly interpreted as new drug use rather than carryover from previous drug exposure. Decreases in absolute drug concentrations, which can also result from urine volume changes, can be misinterpreted as evidence of continued abstinence. Based upon limited, anecdotal information, urine drug levels are often arbitrarily assigned quantitative labels such as "high" or "very high" or "almost negative" in an effort to categorize laboratory results. Treatment providers monitor falling urine drug concentrations in an effort to substantiate continued elimination. Many drug courts utilize urine drug levels in an effort to define substance abuse behavior and dispense appropriately measured justice.

The fact that urine drug concentrations are of little interpretive value will unfortunately come as a surprise to too many drug court professionals.

At best, these interpretation practices are misguided. At worst, the conclusions reached regarding drug use behavior and patterns using urine drug concentrations are just plain wrong! While well intentioned and seemingly logical, the utilization of urine drug test levels generally produces interpretations that are inappropriate, factually unsupportable, and without scientific foundation. Worst of all for the court system, these interpretations have little, if any, forensic merit.

Laboratory/Court Relationship

The controversy associated with urine drug concentrations is complicated by the relationship between drug testing laboratories and the courts. The reporting of urine drug concentrations as part of the drug test result receives little attention within the drug testing industry itself. And if the issue does surface, the discussion often focuses on economic rather than scientific or ethical issues.

In performing a drug test, laboratories must determine the concentration of drug in urine in order to differentiate between samples that are reported as either positive or negative. Testing methodologies require that urine samples producing a drug concentration at or above the cutoff level of the drug test be classified as "positive" and that samples yielding a drug concentration below the cutoff level of the test be defined as "negative" (or none detected). In other words, the sole purpose for determining a urine drug level is to allow the assignment of a qualitative result—positive or negative. The dilemma for the laboratory is what to do with the numeric result (drug concentration) that has been generated during the testing process.

Some laboratories do not report this value even if requested, believing that the urine drug concentration serves no useful purpose or could result in the misapplication of the data. On the other hand, many drug testing laboratories do provide the urine drug concentrations as part of their result report. When asked about the practice of reporting urine drug concentrations, most laboratories admit that these values are not useful for interpretation purposes; however, numerical results continue to be reported because of customer demand. Put another way, laboratories report drug levels because court professionals request those values. Laboratories that report concentrations routinely cite customer surveys that indicate that court programs would be dissatisfied with the lab services if drug concentrations were not provided (i.e., not getting their money's worth). These surveys further suggest that merely reporting "positive" or "negative" results would be viewed as insufficient to meet the court's needs.

Drug Test Manufacturers' Recommendations

By way of review, the drug tests used by drug courts are qualitative. That means that the purpose of the test is to determine the presence or the absence of a drug in a urine sample being tested – period. Either a drug test is positive (drug presence at or above the cutoff concentration) or negative (none detected; drug level below the cutoff concentration). These tests were not designed or marketed to produce quantitative results – how much drug is present in the sample.

The product information materials for the most popular laboratory-based drug test method in use in the U.S. (available since 1974) states the following:

- "A positive result from the assay indicates the presence of drug but does not indicate or measure intoxication."
- "Interpretation of results must take into account that urine concentrations can vary extensively with fluid intake and other biological variables."
- "Immunoassays that produce a single result in the presence of a drug and its metabolites cannot fully quantitate the concentration of individual components."
- "When the test is used as a qualitative assay, the amount of drugs and metabolites detected by the assay in any given specimen cannot be estimated. The assay results distinguish between positive and negative specimens only (Dade Behring, SYVA®, 2003)."

This product information unequivocally established the qualitative nature of urine drug testing. Similar directives may be found in the product literature of essentially all drug testing products. The basis for this product guidance is both technical (issues associated with the testing methodologies) and physiological (how the human body processes drugs).

Physiological Issues Affecting Interpretation of Drug Levels

Drug concentrations in the urine are present in proportion to the total amount of liquid. If the urine is diluted, the concentration of the drug is reduced and when the urine is more concentrated the drug concentration is increased. Urine volume or output is highly variable (both from person

to person and within the same person at different times during the day) and is influenced by a variety of factors, including: liquid, salt and protein intake, exercise, and age. The variability of drug concentrations due to changes in urine volume is significant. Drug levels may vary widely within a day or between days even with no additional drug exposure as a result of fluid intake alone. Without some form of normalization technique (some drug courts use creatinine concentrations to correct for the variations that occur in urine volume) the interpretation of urine drug levels is fraught with inaccuracy.1

As mentioned in the previous section, initial screening tests for drugs detect both the presence of parent drug(s) and their metabolites (chemical breakdown products) simultaneously. As drugs and their breakdown products are eliminated from the body they are excreted at differing rates – those that are less water-soluble are often eliminated more slowly than those that are more water-soluble. This results in a continually changing ratio of compounds that are reacting to the test (i.e., peas are eliminated more quickly than carrots; subsequent tests measure greater amounts of carrots). Due to the fact that these components are eliminated from the body at different rates, thus varying the overall test response, any attempt to evaluate changing urine drug levels that are based upon a result that measures total drug concentration (drug and drug metabolites) becomes extremely problematic.

Eliminating Drug Levels

Has the urine drug level increased or decreased since the last test? How positive is he/she? Does this level indicate relapse? The level continues dropping so that indicates continued elimination, correct? If any of these questions are being asked within the drug court setting, it is almost certain that urine drug levels are being used inappropriately in the court's decision-making processes. For those court programs that use urine drug concentrations to make sentencing decisions, the transition to a non-numerical drug report format (i.e., results simply reported as positive or negative) may be difficult. However, there are benefits. First and foremost, the court moves forward secure in the knowledge that its rulings have a strong scientific basis and are forensically sound. Second, the court no longer has to attempt to interpret data that is not interpretable. Third, courts that have eliminated the use of urine drug concentrations have reported greater confidence in their decision-making process. Making decisions based entirely on either positive or negative reports removes the judicial ambiguity associated with manipulating numbers that few individuals, if any, in the court environment are trained to understand. Lastly, the use of urine drug test results that do not rely on concentrations adds additional fairness and equity to the rewards and sanctions process of the drug court. By removing the unpredictable urine drug levels from the decision-making equation, courts eliminate the unsupportable foundation on which these interpretations are based.

It is noteworthy that in the federal workplace drug testing programs (DOT, DOE, DOD, etc.), the routine reporting of urine drug levels is never permitted. Federally certified laboratories are never allowed to report the numerical values generated from initial screening procedures. These protections that are provided to federally regulated employees should serve to further illustrate the validity concerns associated with using urine drug concentrations in the drug court environment.

The Alcohol Cost Calculator: A Snapshot Report for 1,000 Employees in The United States - Construction and Mining Industry

How Many Employees and Family Members Could Benefit from Intervention and Support?

Problem Drinking including alcoholism, can strike anyone employed by your company. This calculator estimates how many employees and their family members have alcohol problems and how many still need treatment.

For the Construction and Mining Industry:

Number of Employees	1,000
Likely number of problem drinkers in your workforce: The federal government estimates that 9.1 percent of employed Americans 18 years of age and older have experienced serious problems, including alcoholism, as a result of their drinking. The prevalence varies by industry sector. The average prevalence of alcohol problems among workers in the Construction and Mining sector is 14.7 percent.	147
Likely number of the 1,610 employees' family members who are problem drinkers: Problem drinking has a profound impact on the family. Among families where alcoholism is present, more than half of working family members report that their own ability to function at work suffers because of their relative's drinking. Identifying and treating the problem drinking of employees' family members can increase productivity and curb health care costs.	124

Visit the www.alcoholcalculator.org to run statistical reports related to your workplace and industry.