Establishing a reasonable and pragmatic detection window for cannabinoids can assist court professionals in reducing the complexities associated with marijuana-testing results. For a complete review of these issues refer to National Drug Court Institute's "The Marijuana Detection Window."[6]

Table 4. Drug Detection Windows

Drug	Approximate Drug Times in Urine
Amphetamines	1–4 days
Barbiturates	1–7 days
Benzodiazepines	1–7 days
Cannabinoids[7]	At 50 ng/mL cutoff: • up to 3 days for single event/occasional use • up to 10 days for heavy chronic use At 20 ng/mL cutoff: • up to 7 days for single event/occasional use • up to 21 days for heavy chronic use
Cocaine Metabolite	1–3 days
Opiates	1–4 days
Phencyclidine (PCP)	1–6 days
Alcohol (as ethyl alcohol)	variable, usually measured in hours
as alcohol metabolites EtG/EtS	at the 500/100 ng/mL cutoff: 24–48 hours

XI. [§6.11] SPECIMEN TAMPERING

The ramifications of a positive drug test (sanction, program expulsion, imprisonment, etc.), combined with the denial component of substance abuse, often create circumstances whereby clients feel the need to "beat the drug test" by tampering with the sample. Sample tampering represents a significant challenge to the court's mission and can threaten to undermine the legitimacy of the court's policies and procedures, as well as its decisions. Savvy drug court clients are constantly gleaning information about drug testing from a variety of sources in an explicit effort to thwart the monitoring efforts of the court. Table 5 outlines the basic urine tampering approaches and control strategies.

While witnessed sample collections can significantly reduce tampering, it is recommended that all urine samples tested for drug court purposes include testing for creatinine. Sample dilution is by far the most common tampering technique. Diluting urine is simple and cheap and is designed to produce a sample that has a watered down drug concentration that will fall below the drug testing cutoff, thus fabricating a false negative

Table 5. Urine Tampering Approaches and Control Schemes

Type	Method Description	Control Strategy
Precollection Dilution	Consumption of large volumes of fluid just prior to sample collection in an effort to dilute urine drug concentrations to below the screening test cutoff, thus producing false negative results (flushing, water loading, hydrating).	Perform creatinine levels on all drug court samples to assess specimen validity. Samples with creatinine concentrations of less than 20 mg/dL are generally considered dilute and test results do not accurately reflect a client's drug use history.
Postcollection Dilution	Addition of liquid (water, colored fluid) to sample post collection in an effort to dilute urine drug concentrations to below the screening test cutoff, thus producing false negative results.	Direct observation/witnessed collection should preclude most postcollection dilution and determine creatinine levels.
Adulteration	Addition of chemical agents (liquids or powders) to sample (postcollection) designed to disrupt testing procedures or to mask the presence of drugs.	Specimen validity testing (SVT)[8] are specialized tests capable of detecting chemical adulteration agents. Available from most drug-testing laboratories; on-site "instant" SVT devices are also available.
Substitution	Replacing client urine sample with a substitute "look-a-like" sample: • Biological substitution (e.g., another person's "clean" urine, dog urine) • Nonbiological substitution. (e.g., replacing urine with apple juice, Mountain Dew, water with food coloring)	Use of SVT combined with creatinine testing; most nonbiological samples will result in minimal creatinine concentrations.

result. Creatinine is a biological waste material that is produced by muscle metabolism. The measurement of creatinine allows the determination of the strength or concentration of a client's urine sample.

Dilute urine samples (with creatinine levels less than 20 mg/dL) are not normal occurrences. It is unusual for a healthy individual to produce a sample with a creatinine level of less than 20 mg/dL. Therefore, urine samples from drug court clients that yield a creatinine concentration of less than 20 mg/dL should be considered as *dilute* samples. Because the sample is dilute (more like water than urine), the drug test is not able to detect the presence of drugs that may be present because the drugs have been diluted to below the cutoff point of the assay. In cases of dilute samples, *negative* or *none detected* results should not be interpreted as indicating no drug use or abstinent behavior. Positive drug test results from a dilute sample, however, are considered valid because the donor was apparently not able to dilute the sample sufficiently to deceive the test.

A 2005 study that assessed over 22,000 subjects (with urine samples taken from adults and children, different ethnic groups, and at various times throughout the day) determined that the average, normal urine creatinine in the U.S. is 130 mg/dL. While the incidence of dilute urine samples is not commonplace in the general population, in populations known to be drug tested (e.g., criminal justice), the incidence of low

creatinine levels increases significantly. The diluting of urine samples by consuming large volumes of fluid is easy and common in drug court populations; therefore, many courts sanction accordingly for repeat dilute samples. Drug courts are also advised to place a dilute sample prohibition into participant contracts and inform participants that diluted samples are considered unacceptable.

The rapid (over a period of sixty to ninety minutes) intake of two to four quarts of water or other liquid beverages is sufficient to produce urinary creatinine levels of less than 20 mg/dL and result in a sufficiently watered down specimen that no longer reflects recent drug usage behavior. But this is a general guideline because the exact amount of fluid necessary to produce a dilute urine sample is dependent upon many variables, including a person's metabolism, amount of fluids regularly consumed, dietary habits, and occupation.

The important concept is that a creatinine level of less than 20 mg/dL associated with a drug test is *nearly always* an attempt by the donor to avoid drug-use detection, regardless of how much liquid was consumed in order to achieve this result. While it is possible for an individual to unintentionally consume sufficient liquid to produce a diluted sample, this should be viewed as the exception rather than the rule. For clients who work outside (e.g., construction workers) in hot, summer weather and ingest large amounts of fluid, the court should consider testing these clients before they go to work or on their days off.

The bottom line is that the court cannot allow clients (new or veterans) to continue to produce low creatinine samples without some sort of escalating sanction. There is no standardized response to diluted samples. Rather, there is a wide spectrum of judicial responses. Adjudicating a diluted sample as a positive result is one common approach. Some programs allow a single diluted sample per phase (or per quarter) without sanction. Other programs treat a diluted sample as more egregious than a positive sample because it is often indicative of intentional tampering. However a court decides to handle the diluted sample issue, programs should also respond with additional therapeutic interventions when diluted samples are identified.

Participants should receive a sanction for water loading and other attempts at tampering with the test.

Urine creatinine level patterns can also be used to uncover ongoing sample tampering. Normal urine creatinine levels do not demonstrate extreme fluctuation. Therefore, clients producing rapidly changing and significantly high and low urine creatinine levels from day to day (or from collection to collection) are indicative of potential specimen tampering. If a client is capable of producing a sample with normal urine creatinine levels some of the time and subsequently exhibits low creatinine levels on other occasions, this suggests that the dilute collections are not associated with a disease-related problem. Other tampering control measures that can be used by the court include:

- Developing challenging collection strategies (e.g., minimize access to water sources, require hand washing *prior* to sample donation, require the removal of outer clothing (coats), no backpacks, purses, hats, etc., pockets turned inside out);
- Instituting unannounced/random collections;