

DRUG TESTING: Clients' Use of Creatine



Q. I attended a presentation with Paul Cary several years ago, and the recommendation from the presentation was to sanction creatinine levels over 400 mg/dL, treating them as an adulteration. Can you tell me what the recommendation is from NADCP and direct me to any resources?

A. Regrettably, the data and the research on “high” urine creatinine levels is not as clear and straightforward as the material on low creatinine concentrations, because there is much less research. The number one cause of high urine creatinine concentrations is dehydration (a condition that occurs when the loss of body fluids, mostly water, exceeds the amount that is taken in). While dehydration could result in urine creatinine levels as high as 300 mg/dL, it would be unusual for it to produce concentrations over 400 mg/dL.

A severe kidney ailment could also result in an elevated urine creatinine level, but in this scenario the client would produce high urine creatinine values on an ongoing basis, not just once in a while. If a client *always* produces high urine creatinine levels, he

or she should see a nephrologist (kidney doctor) to ensure that he or she is capable of producing “normal” urine or to determine if there is a kidney dysfunction.

A study done in 2005 tested the urine creatinine levels of more than 22,000 people. The researchers tested all ages, many ethnic groups, males and females, at different times of the day, etc.—the most comprehensive study of its kind. It showed that, in aggregate, the “normal” urine creatinine level for an American is about 130 mg/dL. Less than 3 percent of the folks studied in this survey had urine creatinine levels higher than 300 mg/dL, and less than 1 percent had levels higher than 400 mg/dL. We therefore conclude that these high urine creatinine concentrations are unusual.

Urine creatinine levels naturally rise and fall during the day depending on the amount of fluid intake. However, they can also be affected unnaturally by the consumption of creatine, the precursor of creatinine. Creatine is a dietary supplement used by athletes and bodybuilders to add muscle mass. It is legally sold over the counter and is readily available at GNC and other health-related stores. Ingested creatine is broken down by the human body into creatinine. Treatment court clients can use creatine to mask dilution efforts. An individual attempting to hide dilution by taking creatine could potentially produce a urine sample that was “dilute” (and thus had urine drug concentrations below the cutoff level, resulting in a negative drug test) but yielded a creatinine level that appears in the normal range.

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Often, clients consuming creatine cannot predict what urine creatinine level will result. It depends upon the amount of creatine ingested, amount of liquid consumption, time of collection, etc. One way to differentiate between the covert consumption of creatine and a true physical/medical problem is to examine a client's urine creatinine levels over time. If a client continually produces high urine creatinine levels (300 to 400 mg/dL) over a period of weeks, he or she is a candidate for some type of medical surveillance, as mentioned earlier. On the other hand, if the client produces "normal" urine creatinine levels some of the time and high urine creatinine levels on other occasions, this is generally a sign of sample tampering via creatine ingestion.

Courts generally do not respond to elevated urine creatinine levels until they are over 400 mg/dL. Depending upon the physical activity of the clients, these levels can fluctuate during the day. Therapeutically, it may be useful to initiate a conversation with a participant when the urine creatinine levels are over 300 mg/dL, but that level is probably not sufficient to warrant some type of sanction.

Urine creatinine levels that exceed 400 mg/dL are quite unusual in the general population. The problem is attempting to establish why the level is that high. Referring clients to

a nephrologist may help the court resolve whether or not a client is consuming creatine. We also recommend that criminal justice programs prohibit the consumption of dietary supplements and energy drinks, if possible. These largely unregulated products contain all manner of substances, including creatine (many of which are not listed on the product label), and often lead to problems in the evaluation of drug testing results. Ban any over-the-counter product that has the potential to interfere with the evaluation of abstinence monitoring strategies.

Participants who produce urine creatinine levels higher than 400 mg/dL (after eliminating a physical cause) are, more likely than not, attempting to defraud the drug court program (by hiding and denying drug use). This represents a negative behavior that should be addressed with some form of sanction similar to the sanctions given for other negative behaviors, including low dilute samples. Sanctions should be appropriately measured and should escalate as the occurrence of high creatinine samples continues. They could begin simply with a verbal warning and intensify to community service, a homework assignment to write a paper discussing how the kidney works, increased screening with unannounced collections, loss of privileges, jail time, etc.



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