DRUG TESTING:
Specific Gravity

Q. I have read a great deal of your literature pertaining to creatinine and specific gravity as separate methods for determining whether a sample is dilute, but I am not familiar with how the two may work together. One of our defense attorneys is reporting that federal guidelines for drug testing include the use of specific gravity testing in addition to testing for creatinine. Because I do not have a lot of information pertaining to this subject, I thought it would be best to reach out to NADCP.

A. Specific gravity is a measurement of the total amount of dissolved solids in a liquid, such as urine, and includes creatinine along with many other excreted compounds. Specific gravity represents an alternative method for determining whether a urine sample is diluted. The determination of specific gravity for the purpose of defining dilute urine samples dates back to the first federal workplace mandatory guidelines for drug testing (1988). These guidelines have little in common with abstinence monitoring in a treatment court environment, particularly when it comes to testing the validity of a specimen (creatinine, pH, nitrites, specific gravity, etc.). The federal guidelines were established as a "beyond a reasonable doubt" standard (which incorporates both urine creatinine and specific gravity into the dilute calculation) for prospective employees (people obviously not involved in the criminal justice system). In a treatment court context, the burden of proof standard is generally not "beyond a reasonable doubt." Instead, the proof threshold is usually a "preponderance of the evidence" admissibility standard. Adopting the federal dilute standard raises the evidential bar to a point that it can create a barrier to addressing the undesired behavior commonly seen in participants with substance use disorders.

Like creatinine, the specific gravity of urine can fluctuate some during the day and is influenced by the amount of fluids an individual consumes. In that regard, the relationship between urine creatinine and the specific gravity of urine are generally proportional—as the urine creatinine decreases, so does the specific gravity, and vice versa. Rather than attempting to use a combination of specific gravity and creatinine levels to determine urine specimen acceptability, we have recommended that treatment court programs use only creatinine measurements (an approach that is legally defensible based on a "preponderance" standard).

While specific gravity is mandated for some types of employment-related drug testing, it is optional for criminal justice testing. This is most likely true for two reasons. First, it can be a more difficult (time-consuming) analytical procedure than creatinine testing, and second, result interpretation is much more complex. Added to this are the evolving federal rule changes regarding the measurement of specific gravity and the use of the results. Plus, some laboratories use a three-decimal-place reading (1.003) and others use a four-place reading (1.0029).

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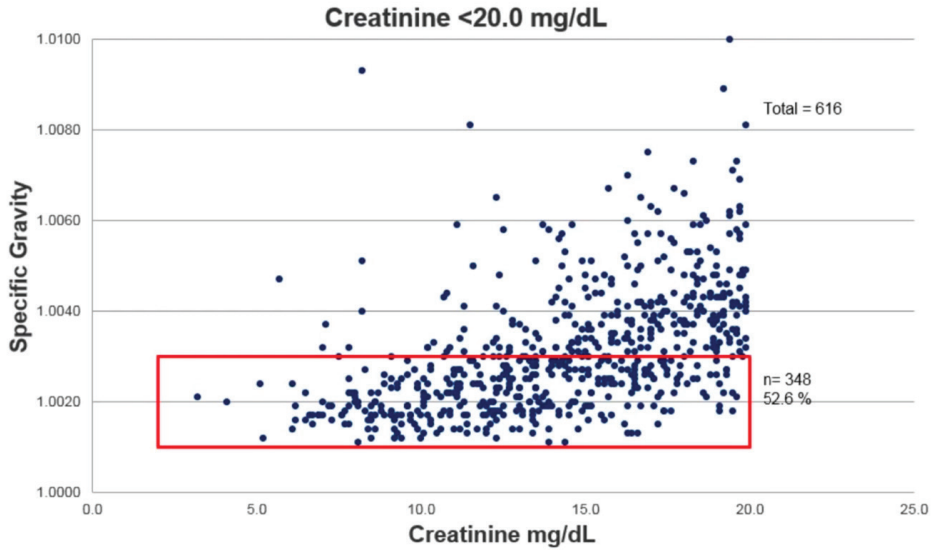
Here's an example of how specific gravity can complicate interpretation. Let's say a client's sample has a specific gravity of 1.003 and creatinine level of 15.0 mg/dL. Is the specimen diluted? The creatinine is low, but the specific gravity is acceptable (under workplace rules). Given that the creatinine is less than 20 mg/dL, it is reasonable to conclude that the sample is dilute, regardless of the specific gravity.

Creatinine and Dilute Urine



The graph shown here references a study done by Cordant Laboratories. It represents 616 samples with creatinine values of less than 20 mg/dL. The red box indicates those samples that have both a low urine creatinine concentration and a low specific gravity measurement, per the federal workplace criteria. The take-away message is that about half of the potentially "dilute" samples are not identified using the more stringent federal standard, and the unidentified samples ultimately would go unaddressed by the court as potential sample tampering. That represents an unacceptable practice in the assessment of client behavior and a significant loss of opportunities to intervene therapeutically to modify behavior and promote recovery.

Using urine creatinine measurements *only* is both a scientifically valid and legally defensible approach to detecting tampering. The treatment court environment is already confusing enough (for both staff and clients). A dilute cutoff that is equivalent to 20 mg/dL (for creatinine only) makes it very easy for clients to understand when a sample is dilute, is easy for staff to understand, and is easier to place into a policy statement or client contract. Win, win, win.

NADCP National Association of Drug Court Professionals

NDCI NATIONAL DRUG COURT INSTITUTE

NCDC NATIONAL CENTER FOR DWI COURTS

JUSTICE FOR VETS

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