



# STERLING NEWS & NOTES

*A Report from Sterling Reference Laboratories*

Fourth Quarter, 2008 – TECHNICAL CONTENT

## Technical Information from STERLING Reference Laboratories

### Artificial Urine: Guaranteed Negative Results!

Since urine testing for drugs started in earnest in the early 1980s, donors have looked for ways to interfere with the urine drug testing process such that negative test results are obtained despite the use of illegal or banned drugs or alcohol. There are essentially three strategies used to accomplish this goal – dilution, chemical adulteration, and substitution. Dilution and chemical adulteration processes are becoming more sophisticated but are still relatively easy to recognize with routine specimen validity testing. These issues have been discussed at length in previous newsletters. Today we will discuss substitution related issues.

#### What is Substitution?

Substitution is simply presenting something other than the donor's own urine for testing. This may be "clean" urine brought in from home that was provided by a child or friend of the donor. These specimens are most often recognized at the point of collection because they are not at body temperature. There are no reliable or readily available tests that would be able to determine if a specimen was actually from the donor. It could also be another liquid resembling urine (apple juice and Mountain Dew are popular substitutions). These substitutions are generally detected in routine validity testing since the substances are physically very different from human urine. Another approach is the substitution of artificial or synthetic urine in place of the donor's own specimen.

#### What is Artificial Urine?

Multiple internet sites offer artificial urine "guaranteed" to provide negative urine drug testing results. These artificial urines, distributed as either liquids or powders to be reconstituted with water, have gotten more realistic over the years and many come with heating pads to maintain normal body temperature. Several sites advertise male or female prosthetic delivery devices available with "clean" synthetic urine. In most states it is not illegal to sell or distribute these products, although treatment programs or probation departments may elect to sanction donors who are caught using these products or devices. Artificial or synthetic urine is man made,

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consisting of water with added creatinine, yellow dye, salts, other constituents and adjustment of pH to mimic normal human urine. The formulations are becoming much more realistic and difficult to recognize. Since normal human urine has a wide range of color and odor, visual and olfactory examination of these specimens is unremarkable. Results of specimen validity testing are normal; by all of the usual criteria artificial urine appears to be the "real deal".

#### Can Artificial Urine be detected?

The answer, dependent on the actual formulation used, is YES, but at what cost? The ability to distinguish artificial urine from real urine depends on the skill and experience of the person making the synthetic urine. An ideal biochemical marker would be a substance that is unique to human urine, would be readily measurable but yet be too expensive or difficult to obtain for the casual chemist to use in the manufacture of artificial urine. There are a number of chemical components of human urine that could be analyzed together to form an "artificial urine panel", but the cost of this panel would be significantly more expensive than the general specimen validity panel and may not be able to detect all artificial urines. The addition of several more esoteric compounds to the test mix would make it more difficult to manufacture a synthetic urine that would pass as normal human urine, but would make routine testing prohibitively expensive. In the past six months, two specimens suspected of being artificial urine, were submitted to STERLING to rule out the possibility of artificial specimen substitution. Both specimens were sent to an outside reference laboratory and subjected to a battery of biochemical tests. For the first specimen the possibility of normal urine could not be ruled out. The second specimen, subjected to the same panel, was definitely determined not to be normal urine.

#### So what CAN be done about this issue?

Fortunately, this is still a very small problem (dilution is still the most common evasion technique used - affecting about 5% or less of all specimens submitted for testing) with a relatively simple solution. **The most reliable and cost effective measure to prevent substitution**

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of artificial urine or chemical adulteration of a specimen is a diligent "OBSERVED COLLECTION". When direct physical observation of the collection is not possible, a properly monitored collection will also be quite effective. Simple steps such as eliminating all hand bags, backpacks and outer garments from the specimen collection room; emptying of all pockets; lifting of shirts to allow observation of waistbands; etc. Specimens with temperatures outside the acceptable range (90-100° F) should be rejected and a new specimen collected. Until reliable, cost effective biochemical panels become available, observed or carefully monitored collections are the best mechanism to detect substitution of artificial urine specimens.

As always, if you have any questions on interpretation, a consulting scientist is available at (800) 442-0438, (253) 552-1551, or via e-mail at [certifying@regtox.com](mailto:certifying@regtox.com).

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