



NCSBN
Leading Regulatory Excellence

2018 NCSBN Discipline Case Management Conference - Toxicology 101 Video Transcript

©2018 National Council of State Boards of Nursing, Inc.

Event

2018 NCSBN Discipline Case Management Conference

More info: <https://www.ncsbn.org/11053.htm>

Presenter

Barry Lubin, MD, FASAM, MRO, National Marketing & Sales Manager, Affinity eHealth

- [Dr. Lubin] Thank you all for being here. I've got the not immediate after lunch task which is a hard window, and when I finish you go on break. So, everybody wants me to be done. And I haven't even started.

In addition to my qualifications that Kathy mentioned, I am a certified medical review officer by the American Association of American Review Officers. For those of you who don't know what the term medical review officer is, it is a term reserved for a physician who has been specially trained in interpreting urine drug screen toxicologies.

And it sort of grew out of the military because drug screening really came to attention after Vietnam. Some of you in the room are old enough to remember that. When soldiers were coming home with a lot of problems with drugs and alcohol. So, the military was really the first institution that started doing drug screening and they needed a physician to interpret the tests, and the term has carried forth.

The other qualification I have for standing here is I'm also a recovering alcoholic and an addict. So, I've been on both sides of the street for many years. So, since I'm being recorded I'm trying to keep my language clean, but I know all the ins and outs of addicts and alcoholics because I am one and I'm not proud, but I will say that I played some of those games myself in the old days.

So, that makes it easier for me to talk to or confront or challenge or whatever verb you choose to choose, the BS that sometimes emanates from the telephone. As an MRO review includes the review of the toxicology report as well as an interview usually by phone with the donor of the specimen, and then my job is to interpret the results relevant to the donor's explanation, i.e., "Urine positive for cocaine."

Participant, "Well, I had a sore throat and took penicillin." No. That doesn't work. So, it's my job to certify that when the donor of the specimen does not own it which happens very frequently as many of you know.

I know a few people in this room but there are a lot of unusual faces, new faces for me to look at. And again, thank you all for coming. In your book, the materials that are put together as a PowerPoint which I'm not going to talk from because I tend to be a stream of consciousness speaker and because PowerPoint lectures put me to sleep, so I don't want to do that for you.

But almost everything I'm going to say is written in your book under the tab that says, Lubin. That's me. So, you don't have to write things down and please enjoy the time we have together. And again, thank you for coming. I'm going to come down there with the rest of you.

If you remember one thing and only one thing from this talk, please remember that not all urine drug screens are the same. Okay? It's just like when you go to the doctor and they order a blood test. They don't ask for everything with the one red-top tube. They test for specific things. Same thing with urine drug screens.

So, for you all who are investigators or for you all who are board members when you see a history and the nurse appeared impaired but the drug screen was negative, the next logical question that must be asked is, "What was tested?" Okay? The most common urine drug screen out there today has got the old name of a night of five which has now become a night of seven, but then the old night of five was amphetamines, marijuana, PCP.

I don't know why I've been in this business a long time. We're seeing a positive PCP but they still test for PCP. And cocaine. Okay? That's the five. The seven has added... Well, let me go back to opiates.

The original night of five opiates just included the natural opiates, morphine and codeine. That's it. Now the night of seven which God bless the Department of Transportation has taken approximately seven years to finally get it passed will include hydrocodone and oxycodone.

But, again, not fentanyl, not a whole lot of things, not benzos. So, again, if the drug screen was negative what was tested? And then the next important thing is was it collected under proper chain of custody protocol? Because if it was not, you get to a board hearing and that nurse has a decent lawyer and the evidence is going to be thrown out because he's going to bring up the fact it might not be her urine, it might not be his urine, and it might not be.

So, chain of custody is critical. We at Affinity, we work with some 18 to 20 nursing programs across the country all our collections are collected under chain of custody protocol. And again, part of what I do as a medical review officer is review the chain of custody form.

Does the number on the form match the number on the report? Is the signature and then there's a printed name and the signature of the participant. Did the collector sign? All of those things you need to look at, again, otherwise, your evidence is junk. And you don't want to take it to a board hearing and have that problem. So, that's real important stuff to please remember.

And everything else I want to talk about is a little bit of the fluff. I much prefer dialogue to monologue. And I was just in... I missed the last talk, but at the 10:30 talk, Rigo [SP] reserved questions for the end. I will be happy to take questions all through this talk.

However, please take yourselves to one of the microphones and when I see you there, I will acknowledge you and we can have a discussion. I don't want to talk over anybody and I don't want to talk under anybody, so I'm going to try to stay middle but I may say some things that some people need clarification on. So, again, please feel free to interrupt me at the microphone and ask a question.

One of the... Well, the first important thing that happens with the urine collection, actually happens at the collection site. Cup in which the urine is produced has an embedded temperature in the cup. It's up to the collector, which is one of the weak points in urine drug screening because collectors are usually entry-level, minimum-wage employees and not that there's anything wrong with that, but they're not professionals.

The transition of collectors at collection sites is huge, but the collector is obligated within 10 minutes to read the temperature. The temperature embedded on the cup is a gauge from 90 to 100.

There is no physiological reason for a urine to be less than 90 degrees unless that donor came in from three hours of ice exposure. Okay? And then I don't think any of your nurses have done that, so there's no valid reason for a cold urine. A hot urine greater than 100, the only explanation I can give that other than substituted and falsified is if somebody went to the collection site with 103 fever, then the urine temperature may be 101, but body fluids approach body temperature, which is why the range here is 90 to 100.

Okay? So, on all chain of custody forms, the collector marks is the temperature within the range 90 to 100. At least 75% of the ones that I see at Affinity, the collectors made a clerical error because I have our staff follow up with the collection site, "Is this real?" or, "Oh no, temperature was right. I guess I checked the wrong box."

So, that also has to be looked at because it happens more too often than I wish it did. So, the other thing that that happens at the collection site are several things. When the donor signs the form they don't read what they're signing. Like most of us who've ever bought a home, you didn't read anything you signed at the mortgage man, right?

You just... That's what the donors do. But what they're signing is a statement that essentially says they certify that this is their specimen. So, all the stuff that they'll tell you of, "The collector mixed it up and it wasn't mine." They've already surrendered that right.

Okay? The other thing about the collection site is the collector takes the cup and in front of the participant and it is the donor's job to watch and to be there. And there are collectors who say, "Just put it down and you can leave." No, no, no. Not if my license is on the line, not if my income is on... No.

I'm there. And you're supposed to be there. The collector in front of the donor then decants the urine into two tubes, each tube has a seal put upon it. One is called the A tube, the other is called the B tube. No difference between A and B except one is A and one is B. The seals are initialed by the participant, certify again, it's his seal.

And I've had cases go to board hearings where we've gotten photographs of those seals to present at the

hearing because it becomes, again, another great thing for the lawyers to blow smoke about. I don't hate lawyers, but they are a pain, right? Anyway. So, what happens with the A tube and the B tube? When the tubes go into a bag, it's a tamper evident sealed bag.

Again, that's sealed in front of the donor. That bag, if opened prior to arriving in the lab, I will immediately know it's been tampered with. And that's, of course, a break in chain of custody. Similarly, in addition to the chain of custody procedure that's performed at the collection, the forensic laboratories, the good forensic laboratories the ones that we work with all keep a log of a chain of custodies signed off on for every person that the specimen changes hands within the laboratory.

And in the 10 years I've been doing this stuff with a whole lot of B tubes been tested, I've seen maybe five where the B tube was different. What happened? Well, the lab then goes back and looked at the procedures as the urine goes down the machines. And the one that I remember vividly, I had a call from the lab toxicologist with the sensor that went into your participant's urine had not been cleaned off from the previous urine, because the previous urine was positive, the B tube was negative.

And again, basic scientific postulate. If I cannot reproduce the result, it goes away. It's not real. That's a basic one of Koch's postulates. Someone may remember that from college or high school biology, but that's a basic principle.

Okay. How do we know the yellow fluid in the tubes is really urine? Because I know somebody who once snuck in some flat Mountain Dew and put that in the cup and thought he'd get away with it. And that person was me. I did that. A group of tests called Specimen Validity Testing, SVT.

Okay? What do they measure for SVT? We measure characteristics of that fluid because we know a lot about renal physiology. We know that a normal human being cannot produce a urine with a pH, for those of you who don't remember basic chemistry, that's the acid-base level of the fluid.

A normal human being cannot produce a urine with a pH less than 3.5 or greater than, I believe, it's 11. There's a range in here between 3.5 and 4.9 and there's a range in here between 9.0 and 10.9 where the urine is reported as invalid.

And there are multiple reasons why you look at a report sometimes and see invalid. A pH that is out of this is... You know, 95% of the urines produced by normal people are in that range. That other 5% can be without adulteration can be greater than 9 or less than 4.9.

But the laboratory machines are calibrated to work specifically between this pH. So, an invalid urine based on pH is tested and it is reported, and if everything is negative, it's usually really negative, but when I see those come in, I tell our clients what's going on and then correct it and then re-test the specimen, re-test the donor, new specimen.

Another thing that's reported is oxidant activity. That's the power of certain chemicals to oxidize what's in the urine. Oxidant activity is used to do a lot of adulterations.

Okay? PH also is a lot of adulterations. Vinegar lowers pH. Bleach raises pH. Okay? Oxidant activity is interesting because, again, the bulk of your participants are females and females are more prone to UTIs

than males and UTIs cause an elevation of oxidant activity. So, if oxidant activity is greater than 200, it's reported as invalid.

Still tested, but again, donor you need to go to your medical doctor, you need to get evaluated for a UTI and if it's present, get treated, and then repeat the urine. Color. Now, you all are intelligent adults.

It's not always the same color when you go void, right? But it's always a variable shade of yellow and the machines again are calibrated to work with yellow fluid. Certain things and many of you are also familiar with will change the color of urine. Orange, bright orange, Azo, the old pyridium which is now an over-the-counter thing which is now what many people go to instead of spending their time and money at the physician's office if they have symptoms of a cystitis.

But the orange color makes the urine invalid because the machinery cannot work with orange in a consistent fashion. If you have a nurse who is selected for urine drug screen today and they call you and say, "I've been taking pyridium, so you have to excuse me."

Well, the answer is, delay them... Your answer is, "Stop the pyridium and go in 12 to 24 hours." Okay? Because hopefully, you'll still catch if there was anything there. But if they go with orange urine, it's going to be thrown out by the lab.

There's also a product on the market called Urised. It's another one of those things like pyridium. It turns green. I was at a conference where it was reported that a donor ate so many tomatoes, her urine turned red. I heard that story. I don't know if it's true or not. But what does happen with red urine is females who go when they're menstruating, if they don't have a tampon in in, the urine can be bloody, and in addition to that, sometimes changing the color of the whole specimen.

The other thing it often does is we get a report of invalid because tube A does not look like tube B because tube B was the bottom of the cup where most of the red blood cells had settled. So, very often tube A is yellow or medium yellow and tube B is pinkish. But if I can find out that the nurse was menstruating, we can still run that test.

And in fact, the laboratory, again, all invalids are tested, so nurses do not get their money back if it's invalid because the laboratory has done its job. But we also have the option to have the donor pay a second time and run both tubes.

Now, in the cases where that has happened, I've never seen the two tubes be different result wise. Different color because of the physical properties, but the result have always been the same in my experience. And again, when you think about the procedure, it would be sort of hard for anybody to adulterate one tube and not the other. I mean, a full adulteration...

That's the other thing I want to go back to. At the collection site, some of our clients demand all urines to be observed, and some don't, and some will do a percentage observed and a percentage not observed. Observed urines... in a perfect world, everything should be observed, but it's not a perfect world, ladies and gentlemen.

We know that. In my experience as a donor of urine, there was a time that all my urines had to be

observed because I had been a bad boy because the program that was monitoring me didn't observe everybody but they did me. Anyway, but in my experience, those 50 to 100 urines that I had that were observed, if I was over here doing my thing, the observer was over there looking at the ceiling.

Okay? That's my experience. Male's anatomy is a little easier to observe, but again, it needs to be observed eyeball to urethra, not, I stood at the door and watched him pee. That's not observing. And, of course, women's anatomy is such that it is very difficult for an observer to know that urine is actually coming out the urethra and not the vaginal vault.

At least three times a year I'll get a call from a collector who says, "When I went into the bathroom after this person left I found a used condom in the garbage can." And nurse had brought in clean urine in a condom, inserted in the vaginal vault when the observer was not looking, got a little pin, pricked it and the urine the came out and it was clean urine.

But this was a good collector. Not all collectors are good collectors. There's also devices sold on the internet to help people cheat. If any of you watch the show "Entourage," the Showtime show "Entourage." Several years ago there was a whole episode about the leading character who had a movie contract where he couldn't use any pot, but he did.

So, he got something which is available on the internet called a Whizzinator. And if you've never heard of it, Google it. When it first came out there was only one color. Then they graduated to three colors. It's now available in five colors. What is a Whizzinator? A Whizzinator is an artificial phallus-looking instrument which is attached to bladder, if you will, the deluxe models come with a heater to keep the specimen at room temperature, at body temperature, and it's attached by the donor with a band around his waist.

So, a good male observer, if he's truly doing his job, in addition to eyeball to urethra, he asks the man to raise his shirt and lower his pants. Now, does that happen all the time? I certainly know it doesn't.

It just doesn't. And again, women, there is a... I had a call. This one I learned from a collector. A collector called me about a year ago, she said, "Dr. Lubin, I found something in the toilet when the donor left. So, I put my gloves on and fished it out." This was a really good collector. "I put my gloves on and I fished it out."

And I said, "Well, what was it?" She said it was a hard, red, plastic object shaped like a tampon that has a tube inside it to put the clean urine and a drawstring at the end of it that if they pull the string, when they pull the string that tube sends the urine out.

Okay? Again, I think it's easier to not use them to do all the things that people sometimes do to beat a test, but that's what people do. And that is available online as well. I believe it's also designed for people with certain sexual paraphilias who like body fluids because it's on some sort of sex or love website is where I saw it.

But I didn't find it. A friend of mine found it and told me about it. I really didn't, ladies and gentlemen. I really didn't. Anyway. So, observed versus not observed. Again, your program is going to make its decision, but you have to factor in all those factors.

The problem with observed... The other problems with observed is the observed sites charge your participant more. Some of you say, "Well, I don't care," but it's a fact. And there are fewer and farther between. Again, people in a city like Denver are not going to have a problem finding a site. But somebody up in the mountains... And we work with a lot of rural states.

I mean, to find an observed collection site for somebody in a very rural environment sometimes requires them to drive quite a distance to the collection site. So, those are two of the other real problems that come up if you are to observe. I'm not telling you not to. Many of our programs will randomize a percentage of their collections observed versus not observed.

And again, the donor doesn't know what's going to happen today. And, of course, the other way to beat a urine, which I knew a guy when I was in treatment. He was a nephrologist, so he synthesized artificial urine in his basement, catheterized himself, voided. Catheterized himself instilled what he had made, and again, went to the collection. And today with the internet availability of synthetic, clean urine that is also happening.

I will occasionally get a call from the laboratory from a good toxicologist of which there are many and they'll say, "Dr. Lubin, this urine's pattern of absorption is compatible with a synthetic urine." I heard a program at Northeastern State where three nurses in the same peer assistant group all had that same pattern and they all had ordered the same synthetic urine, but you cannot prove...

The laboratory can't prove it's synthetic. They can tell me it looks like, seems to be. And I'll get to something called creatinine in just a minute which is another thing we look at about synthetic urines. But that also happens. If somebody wants to beat the system, it's not a fail-proof system.

It is not. I can't stand here and lie to you people, because I'm in recovery and I can't lie, otherwise my disease will get the leg up and I'm not going to do that. It's not a perfect system and it's not a fail-proof system. Additionally, most people would like to think that the first time a participant uses they're going to get caught because that's really going to protect the public.

Right? The truth is, in my belief, and there's no studies, but I believe that's often not the case, but that's why it's important to randomize urine drug screens. And randomization needs to include things like back-to-back, because every addict, I don't care how good my recovery was, when I was testing twice a month, every month, the day I gave that second one I looked at the calendar and said, "I got 10 days. I have seven."

So, urine frequency has to be shaken up. Friday, Monday is another great way to get people. And again, it's not a gotcha game. It's a public safety issue. But I sometimes slip into the gotchas too because it is.

It is and that's the nature of the beast. The other things now. Some board orders with some programs I work with say, "You will give two urine drug screens a month. Period. End of discussion." That's bad. That's bad because, again, just like I said, when I was given two a month I had known when my window was clear and I think I probably took advantage of it once or twice.

So, when we have a program that says, "We'd like to test twice a month," my recommendation is always,

"Let's do 26 or 28 through the year so that two or three or four months is going to be three tests." Keep people off balance. Other things that keeps people off balance is some programs are five-day-a-week programs.

And a controlled... Use in a controlled nature which most of your people can do. If they use early Friday and pee late Monday, some people will get away with something. Okay? Many of our programs are six and seven days.

Again, the very limiting step here is the collection site, more expensive, less available. But what we tend to do for those programs is, again, in a city area, get a whole bunch of people on a Saturday or Sunday and then, of course, the grapevine spreads the word, "Oh, they're testing on weekends." So, that becomes another thing to do to avoid that problem.

The other very important, very common problem in the world of specimen validity testing is the creatinine level. Those of you who are medical, nurses and people who are medically trained know the word creatinine most commonly from a blood test to measure kidney function. Right? Very good test. It's been around forever and we still use it.

Used it when I was a medical school 40 years ago and we're still using it because it's good for that. Creatinine in the urine is completely irrelevant as far as kidney function. Well not completely... It's 95% irrelevant for kidney function. Creatinine is a byproduct of muscle metabolism. Okay? And we look at the level in the urine to determine the concentration of the urine.

Why is that important? Concentration is important because, again, for someone who only used the little and they give you a urine that's dilute, it could be negative for that substance. Picture this glass of water and I put one drop of red wine in it. It's barely going to change the color, but there's wine in it.

But if I put 2 ounces of red wine in it, you're going to have a pink urine. So... A pink glass of water. I confuse that all the time, not when I'm drinking. That's the good news. So, creatinine is important. The normal level of urine creatinine cited by the laboratories is 20 to 300.

Why such a big range? One of the reasons is because I said, creatinine is a byproduct of muscle metabolism, the body habitus becomes important. And a little, anorexic female who weighs 100 pounds soaking wet is going to have trouble giving you a creatinine on the higher side as opposed to the bodybuilder, Sam after he came in from a workout I would expect his creatinine to be up in the 200 range.

So, it's important. But then when I work with clients about these low creatinines and I say, "Well, what is your participant look like?" And many say, "I don't know." I mean, some of you all run programs completely over the phone and don't meet with people, so we have to work with that. A study was done and the average person on an average day has an average urine creatinine of about 100.

So, if that bodybuilder who came in from the gym and he had a creatinine of 30 or 40, it would still be normal but there's something wrong because he should be way up there. The reverse for a thin female if she came in with a big creatinine, something is going on.

The high creatinine... Before the onset of the internet and synthetic urines we didn't worry about high creatinines because actually physiologically we can produce very concentrated urine in a starvation state, in a dehydration state, and gastroenteritis, going at both ends and not replacing fluids adequately.

I've seen creatinines that are 400 or 500 and the body can do it. But the problem is with synthetic urines, many of the products available come as a powder. And if they're reconstituted without the right amount of fluid, they can see a high creatinine.

And again, it's a clue. I can never prove that it's a synthetic urine based on a high creatinine, but I can tell you that I'm pretty suspicious that something's going on. And if you're not observing, the next one needs to be observed because something is going on. Well observed because something might be going on. Low creatinine, again, are an issue.

If you Google, "How to beat urine a urine drug screen" on the internet, you will see hundreds of entries all of which say the same thing. Dilution is the solution. And it works sometimes. Have any of you have been in a paraphernalia store? Nobody in this room. If you've never been in a paraphernalia store in your lives, they sell products to clean your urine.

You know what those products are? Nothing. They are glob of dirt or glob of an inert substance. What do they do? The instruction say, "Take this substance," after you spend 39.95, "Take this inert substance and then drink eight glasses of water." Okay?

I provide a list of things to do to avoid dilute and low-creatinine urines. Real simple things. One of the big offenders is caffeine and amongst us as health professionals, many of us are caffeine addicted. Caffeine does function as a diuretic. Okay? So, I tell these folks with low creatinine, "No caffeine on the day of selection until you've been to the collection site."

Similarly, if they're on a diuretic for hypertension, I don't say stop your medicine, but take your medicine after you leave the collection site, because, again, a diuretic by its nature is going to produce. And nurses are the best group of people I talked to with this one. Hydrate with full liquids and not clear liquids. Please go to the microphone or I'll repeat it either way.

Because nurses understand full liquids. When I say that to a physician is like talking French. - [Audience Member] I also think in there to include that some of the diabetes drugs, the SGLT2s are also diuretics, they're going to make those patients urinate a lot too.

- Diabetes is out of control with elevated glucose functions as a diuretic. Polyuria or polydipsia or polyphagia. Some of you remember that. Yeah? Yeah, that needs to be addressed. Well, glucose in the urine does something else which I'll get to when we talk about alcohol. That needs to be addressed.

So, creatinine needs to be looked at. What we in the clinical world do which the scientific toxicologists don't really approve of. But when I see a quantitative level in a urine drug screen of marijuana and that quantitative level is 20, but the creatinine was 20, I would say, "Well, if the creatinine were 100, five times 20, then that concentration would also be 100."

So, it looked like a little pot really wasn't a little pot at all. Okay? While I'm on quantitatives, the

quantitative values you see on urine drug screens are of little value. They are not valid enough and scientifically enough to be able to tell you that she's taking more Adderall than she's prescribed or she's taking more Tramadol than she's prescribed because there are too many variables that go into those concentrations, including time of day that the drug was taken relative to the time the urine was donated.

So, I can't do that, but get somebody in who was a pothead and smoked like Cheech and Chong, some of you remember them, they will have a positive marijuana for up to three to four months sometimes. But quantitative is valuable with them because if you normalize for creatinine, you should see a gradual decrease.

If there's suddenly a... And again, it's relatively straight. If it gets a little bump, I don't worry about, but if it's got a big spike, well, you know what's going on. They're not abstinent. Okay? So, quantitatives have their value but it is limited. So, we do creatinine.

It's very important to look at. And again, for me who looks at urine drug screens all day long, I've had to develop a system. And one of the things I suggest to you all is develop a way to look at that report. Look at the creatinine, look at the pH, look at those values first, and then look at the substances, because again, if you just look at the substance and get excited with a positive or get excited with a negative, if it's dilute urine, it doesn't mean as much as if it were concentrated urine.

So, I think it's important. And again, I do this all day every day, so I have a system. You guys, you're investigators, you're doing it a lot. Board members you're heard at board meetings. You had a file to review before a hearing. But yeah, look at it like you look at any lab report. Don't just look at the final result, please, because you're going to miss things if you do.

Let's talk about alcohol because alcohol even amongst health professionals, is still the most commonly abused drug. More people die from nicotine and alcohol than any other chemicals around. We can test for nicotine. We have... I know a few... There's one program, physicians program that mandates nicotine free and they will test for a nicotine byproduct in their urine.

Most programs don't go there. But alcohol is the most commonly used substance even amongst health professionals. Prior to 15 years ago, I believe people could have consumed alcohol on a regular basis through their whole monitoring period and never be detected because of the metabolism of alcohol.

And I'm not trying to make basic scientists and biochemists out of you, but just a basic understanding will help you. If Sam got drunk tonight and sat on the barstool to 2:00 o'clock in the morning and then called in tomorrow morning to be and he's selected to pee. If he gets well hydrated without alcohol and starts drinking fluids and he can find a collection site that's open 3:00, 4:00, 5:00 o'clock in the afternoon, by that time, that alcohol is already gone from his urine.

Okay? Because that's the way... That's the rapidity that urine metabolizes through the kidneys. Of course, most urine is excreted through our breath and our lungs, but the urine that is reserved goes to the liver, goes to the kidneys. The pure alcohol that goes out goes out that quickly. The other problem with urine and alcohol we alluded to with my friend and his glucose question.

One of the things that can happen after the urine is in the cup is fermentation can occur more commonly

in diabetics who are spilling sugar but also associated with UTIs. And I always see more of these in the summertime because of the heat. You take a fluid, and even a normal person, non-diabetic person's urine is a little bit of sugar there.

So, you take a little bit of sugar or a lot of bit of sugar, put it in a fluid where there are bacteria and/or yeast and leave it out in the heat. You're making alcohol. So, alcohol get lots of positives, and I don't like to use the word false. It's really is a positive alcohol, but it's not from ingestion.

It's because the alcohol was produced in the cup. How do we tell the difference? And again, up until 15 years ago, we had no tool to tell the difference. And about 15 years ago we started talking about two substances, EtG and EtS. Alcohol, of course, for those of you in a little chemistry, chemically is EtOH, Ethyl Hydroxide.

EtG, Ethyl Glucuronide made by the liver, and Ethel Sulfate, also made by the liver. What we've learned about these two products is that, one, they're produced by the liver, two, they're small enough to be excreted in the urine, and three, they can hang around for up to 48 to 72 hours after a dose of alcohol.

The problem we got into early on is we thought we had the cure-all for this alcohol problem and every EtG person was drinking. They've been lots of studies done and we now know a lot more about environmental alcohol. One of the biggest offenders for your guys is hand sanitizer.

Again, isopropyl alcohol, rubbing alcohol, alcohol prep wipes. That's not a problem. But for whatever reason, probably economics, most hand sanitizers available in ER and on the floor and a Kroger and everywhere else because we've become germaphobic is a combination of ethyl alcohol and isopropyl alcohol.

What we've learned is that ethyl alcohol in those products can be absorbed by the body, not through the skin, however, but by inhalation. Okay? So, if a nurse is being monitored must use hand sanitizer, I tell them, "Well, go talk to your DON and see if you can get just isopropyl pure hand sanitizer."

Or, again, if you must use hand sanitizer with ethyl alcohol after you put it on your hands your hands have to go down here, waist level or below. And I gave this talk somewhere and one of the nurses said, "No, we have to walk in the OR like this." So, I said, "Then you have to get isopropyl based hand sanitizer even if you buy it yourself."

And of course, those of you who are anywhere near my age, long before hand sanitizer we used plain old soap and water. So, that still works. It still works. Ethyl alcohol is also in a variety and a host of household products. Mouthwash is a big one. Okay? Cough and cold preps is another huge one.

Any cough and cold prep on the shelf that does not say in giant letters "Alcohol-free" and probably cost twice as much, contains alcohol. The manufacturers and the Food and Drug Administration, I'm not saying they're in cahoots, but because the ethyl alcohol in most cold and cough preps is called an inert ingredient, the manufacturer is not obligated to list alcohol in the ingredients.

So, somebody can pick up a bottle and be diligent and read the label and they didn't see alcohol, but again, if it doesn't say "Alcohol-free," assume it's alcohol-based. Mouthwash, another one. In the

kitchen, anything that says "Extract". The process of extracting is done with ethyl alcohol.

So, cooks need vanilla flavor, not vanilla extract, orange flavoring, not orange extract. What if they go out to dinner and order a piece of cake? Well, I'm usually not that rigid, but out to dinner is a significant issue because I'm not that rigid about the extract that there might be in one slice of a dessert.

But in a restaurant, go to a lovely continental French even many Italian restaurants, they cook with wine. And a good participant will say to the waiter, "Well, this was cooked with wine. I can't have it." And waiter 90% of the time will say, "But it's cooked out." Wrong answer. Okay? In order for the alcohol to be cooked out, temperature of something like 300 degrees for a minimum of 20 minutes must be maintained.

So, your participants who are on an abstinence contract need to avoid anything that is cooked with alcohol no matter what the waiter says. And when the waiter says, "I don't know," I send them back to ask the chef because that's how important it is. And it is. So, that needs to be looked into and taken carefully.

So, we had EtG and EtS. The problem with EtG and EtS is because of this over-exuberance about its use. Those of you who are used to looking at urine drug screens on a bottom of a report that test for EtG and EtS, there's a statement that says, "EtG and EtS alone does not prove alcohol ingestion."

And it's true. It doesn't. That was done in 2006. In 2012, SAMHSA revisited the issue and many of us hope they would just take it off. They didn't. But what they did put in their updated paper in 2012, which is available on the SAMHSA website or email me and I'll send it to you, says that "An EtG greater than 1,000 is rarely due to incidental exposure."

So, when you see an EtG of 600, 700, 800 with a normal creatinine, again, that's another one where I always normalize the creatinine. EtG of 600 with a creatinine of 100 is a whole different ball game than an EtG of 600 with a creatinine of 20, because, again, I got to multiply that by that five-factor, so it's greater than 1,000.

But EtG and EtS, even when we use it and use it rightly, only goes back 48 to 72 hours to detect alcohol ingestion. About six or seven years ago, we began using a test, and here's that ET still in the middle. It's called a PETH test.

PETH stands for Phosphatidyl Alcohol. Okay? Phosphatidyl alcohol is another metabolite of ethyl alcohol also produced by the liver. What makes it different than EtG and EtS is it's a big fat molecule attached to one of the circulating phospholipids in the body, and not only is it attached to the phospholipid, that phospholipid goes into the production of red blood cell membranes.

So, phosphatidylethanol as a metabolite can be detected in the blood and not the urine. And what we've learned in part because of the lifespan of red blood cells, they don't live a long life 60 to 90 days average. Because of the lifespan of red blood cells and because of the pharmacodynamics, what we know is a PETH level of greater than or equal to 20 can be explained by one and only one thing today.

It's relatively new. Will somebody make a liar out of me in 10 years with a new study? Maybe, but the

state of the art today says that a PETH level of 20 or greater can only be explained by the ingestion of a minimum of seven ounces of alcohol within the previous two to four weeks.

Okay? What's an ounce of alcohol? An ounce of alcohol is defined as an ounce and a half of a distilled spirit, a 12 ounce can of beer or 5-ounce glass of wine. Okay? There is no study that has ever shown a PETH elevation from food, for example, or from environmental exposure.

That doesn't exist. A positive PETH is about as black and white as my business goes. Okay? Because it's diagnostic today. Again, it may change down the road and you may hear something, see something, read something and say that guy lied. I'm not lying because that's what we know today. Was that a question or an eyeglass?

Okay. Okay. Time is getting late. Let me talk about some of the common substances of abuse in addition to alcohol. Opiates, of course, are a big one.

We're sitting in the middle of an epidemic. The epidemic is not about Tylenol with codeine, it's about hydrocodone and oxycodone and fentanyl. You know that, again, DOT is adding oxy and hydrocodone. Fentanyl is not part of anybody's routine, except at least one of my clients test their participants...

Because fentanyl in the old days was available to the CRNAs and the anesthesiologists. Today, lollipops, patches. I mean, I know of addicts who've taken patches off patients, suck the liquid out from under the membrane, and then injected it. So, many of our programs get a fentanyl test every quarter routinely because, again, if the nurse works in the GI suite or in the ER, or, again, even on the floor these days.

I did have a nurse that same state as the other one I talked about. She was visiting her dying grandmother. This was the story. She had a sky high fentanyl level, visiting her dying grandmother and grandma left a lollipop in a cup next to her bed and the girl was hungry, and having a sugar craving, so she ate grandma's lollipop not knowing it was a fentanyl one.

That's the story. I mean, you know. I love my job because I hear all sorts of make-believe all the time. And they're so creative, so creative. So, opiates are a big deal and need to be looked for. Nurses have access and a lot of addicts and alcoholics like opiates as their drug of choice.

In the old days when I was in treatment 25 years ago, the most common drug of choice for nurses was Demerol. Demerol sort of gone away over the last 15, 20 years and been replaced by hydrocodone and oxycodone as the most common drug nurses will abuse. The story about poppy seeds is real. Okay?

Any person you put on an abstinence-based contract you must forbid them to eat poppy seeds. Now, again, in the old days where you say, "Well, you probably have to eat a bushel of poppy seeds." Studies have been done that show some poppy seeds are much more potent than others. And, of course, poppy seeds from the poppy plant which is the source of the natural opiate.

So, poppy seeds must be forbidden in your abstinence-based contract. And while I'm on that subject, again, stream of consciousness, the other thing that many of you don't have in your contracts, which I encourage you to add, is no hemp, H-E-M-P.

Hemp and hemp related products it's had a rebirth in the health food stores, cures everything. And the hemp sold in the U.S. is supposed to be THC free, but there's evidence that many of the products are not. Okay?

So, you don't want somebody smoking pot and blame it on their hemp supplement. So, again, I suggest you strongly consider banning that in your abstinence agreement with your participants. Okay? So, opiates need to be tested for hydro- and their metabolism is fairly easy to...

It was easy for me. I do it every day. But that's all listed in the Lubin slides. Hydrocodone comes out both as itself and/or hydromorphone. So, sometimes I'll get a call from an investigator, "There's hydromorphone in the urine. She must have diverted dilaudid."

Not necessarily. It could all be hydrocodone that metabolized to hydromorphone. Morphine... Codeine metabolizes to morphine. Okay? So, they've diverted Tylenol 3, why, I don't know, but that morphine in the urine, that's for a reason.

Okay? Fentanyl metabolite has one major metabolite called norfentanyl. And it's easily detectable if test is ordered. Again, lab is not going to do anything you don't order because they're not going to get paid for it. So, again, templates for testing make life easy, but I think it's extremely important to look at your individual participant's history.

An addict or an alcoholic will... Everyone I've ever known has one particular drug of choice. However, if an addict or an alcoholic can't get the one he loves, he's going to love the one he's with. Okay? At the same time many who've used synthetic cannabinoids spice and K2, there's a test for that, not routine THC testing, no.

It has to be ordered. But if you get that in their history, if you get that from their treatment records, if you get access to that and they've been to treatment, periodically, grab a test for it because if you don't order a test for synthetic cannabinoids, they're going to pass every routine drug screen you give them, everyone until they get psychotic and die, which is what happens from those drugs.

Bath salts, another one. There's one out there called Flakka, another one. And there's the one whose name I don't remember that gives a crocodile skin. That also can be tested for. It has to be specifically ordered. Let's talk about cocaine. Cocaine is a relatively easy one because it's got one basic metabolite that I abbreviate BZE, it's benzoylecgonine.

There's only one reason to see benzoylecgonine in the urine and that's the metabolism of cocaine. Period. End of discussion. I just had one this week. A nurse had a significant level, not sky high BZE. "Well, I don't use cocaine but my boyfriend does." "So, tell me about that." "Well, this one was less X rated than some of the ones I got. Well, we haven't had sex in months, but we do a lot of kissing."

And I said, "And how does he do the cocaine?" "He snorts it." So, mucous membrane to mucous membrane. And many people who snort cocaine rub their lips, rub their tongue, rub it up. And there's no way, if the BZE is in the urine I can say that she gave me this history, but I can't say that she didn't do a line herself because the urine looks the same.

Same thing with THC and secondhand smoke. Let me tell you the truth about secondhand smoke. If Sam was in the car with four people who smoke like Cheech and Chong for one solid hour to the point where his eyes were burning from all the smoke, he might have some THC in his urine. "So, I was at a concert and I walked by somebody who was smoking a joint."

No, no, no. CBD oil, another great offender. Many of you, I'm sure like me, get at least three to five spam emails a day selling CBD, a week, selling CBD oil to cure everything. First of all, it hasn't been proved to cure anything, and second of all, to the best of my knowledge, there is no commercially available, 100% pure CBD oil.

And again, urine drug screen comes back positive for THC, usually a relatively low level. Our cutoff is 10. I've seen non-positive greater than 20 but I've seen several and that was the history. And most CBD oil is... All CBD oil that I know is contaminated with THC.

So, your participants, no CBD products. Okay? Because, again, even a low level I can say it's compatible with CBD oil, but I don't know they didn't smoke a joint five days prior and they have a low level now. Okay? Kathy is looking to me and I'm almost out of time. Let me just briefly say, hair and nail testing is valuable, however, it has its limitations. Okay?

The limitations are such that a positive hair and nail test does demand an explanation, usually ingestion but I'll get to that in a second, but a negative hair and nail test does not prove abstinence. So, ladies and gentlemen, you can't replace urine drug screening program with a quarterly hair and nail because you're going to miss things. Why do I say that?

Because it's easily adulterable, dying, bleaching, perming. Again, Google about "How to beat the hair test." Peroxide and lemon juice that some of us remember for bleaching our hair is back on the internet for adulterating hair. Soak your fingernails in alcohol and vinegar for a day and you're going to neutralize whatever's in the nail. But hair and nail tests are valuable as an adjunct.

Hair and nail testing is available also in all the basic substances of abuse and EtG can be tested for in hair and nails. I'm out of time. And I'm on OCD chronic early, so that means I have can't be a chronic late. So, I will be here if you have any questions you would like answered, please come talk to me.

I'm going to put my cards on the table. I'm not advertising, but if Affinity works with you or not, take my card if you want it. If you have a question about a drug screen, call me. I don't care if you're an Affinity client or not. I'll talk to anybody anytime about pee. So, please, call me.

I welcome those calls. Thank you very much.