

Why does it take so long?

Toxicology analysis has several steps. The first step for most samples received in the Toxicology Unit is alcohol analysis. Once this is complete, a report is issued to the submitting agency. If drug testing is also needed, the drug screen is performed next. Finally, any drugs indicated in the screening are confirmed and/or quantitated. Each class of drugs requires a separate analysis for confirmation and quantitation. Therefore, if several drugs are detected in the drug screen, the confirmation/quantitation portion will take longer than if only one or two drugs are detected. Once this portion of the testing is complete, a report is issued to the agency.

The analysts perform the testing in batches. This is done for efficiency. Each test performed requires that a set of quality control measures be completed. For quantitations, these measures include establishing a calibration curve and checking the accuracy of that curve through the use of positive and negative controls. Additionally, the equipment used for the analysis must demonstrate that it is working properly before the analysis can be completed. For these reasons, once all of the quality control requirements have been met, it is efficient for a number of samples requiring that same type of analysis to be completed at the same time. Hence, the batch analysis is preferred.

Once each set of testing is complete, the data must be processed by the analyst and then prepared for review by another qualified analyst. This is called a technical review. Each set of data produced by the Toxicology Unit undergoes technical review. This means that if five drugs from five different drug classes are detected in a sample, each of those five sets of data undergoes a technical review. Once all of the tests and technical reviews are complete, a report is drafted. This report is reviewed for accuracy by an analyst and by a supervisor before it is issued to the submitting agency.

Do you have recommendations for submitting samples for OWI analysis?

The preferred blood collection tubes for toxicology samples are gray top tubes. These tubes contain the requisite preservative and anticoagulant. Tubes with purple tops are also acceptable. A sufficient volume of blood is necessary to complete toxicological testing. Fifteen to twenty milliliters of blood should be collected (each tube in the Wisconsin State Laboratory of Hygiene blood kit can hold ten milliliters of blood). Too little sample may limit what tests the laboratory can perform, and it may be necessary to decide which tests are most important and which can be delayed until it is known whether there is enough sample. Please contact the lab if there are questions regarding the volume of blood collected.

Urine samples should be placed in a watertight sealed tube if possible. Otherwise, be sure that the specimen container is closed tightly and placed in a sealed plastic bag to hold any urine that might leak out of the container. Urine samples may also be submitted in gray top tubes.

Please notify the laboratory if the sample is associated with bail jumping and there are restrictions, such as “no alcohol” or “no drugs”. If drugs are suspected, please be sure to state which drugs are suspected. When the use of a single drug, such as THC, cocaine, or heroin, is suspected, please request targeted testing.

How can I ensure that my samples are analyzed in the shortest amount of time possible?

The main things you can do to ensure a shorter turnaround time are to (1) provide all of the necessary information (including correct dates, spelling of names, etc.); (2) communicate with the Toxicology Unit when anything changes or when new information becomes available; and (3) submit your samples to the proper laboratory for your service area. Specifically, if alcohol analysis will be sufficient as long as the ethanol

concentration is greater than 0.08 g/100 mL (or 0.02 g/100 mL or any other concentration), please include that on the evidence transmittal or the paperwork included in the blood kit. Please ensure that any handwriting on your paperwork is legible and that the requests for analysis are clear. Occasionally, the Toxicology Unit receives paperwork with ambiguous instructions. This delays the dissemination of the laboratory report while clarification is sought. Also, if specific drugs are suspected, please indicate this on the evidence transmittal or on the paperwork in the blood kit. This information will help the analysts ensure that the type of analysis needed is performed on the sample. Additionally, if only a small amount of sample is available, having this information will help the analysts direct the analysis in the most informative direction. Finally, please be aware that the Wisconsin State Crime Laboratory in Wausau now performs blood alcohol analysis. Therefore, if you are within the Wausau service area, please be sure to submit your samples in need of alcohol analysis directly to the Wausau Lab.

I am a Drug Recognition Expert (DRE), and I sometimes perform evaluations for agencies other than my own. How do I go about obtaining a copy of the Confidential Report of Laboratory Findings?

The policy of the Crime Laboratory is to only release information to the submitting agency. Therefore, the case agent must contact the Crime Laboratory and authorize you to receive a copy of the report. Please have the case agent contact your local Crime Laboratory for details.

What kinds of blood tubes do you need for alcohol and drug analysis?

For alcohol analysis, the preferred blood tube is one that has a grey stopper or cap. These tubes contain sodium fluoride, a preservative and potassium oxalate, an anticoagulant. The blood kits issued by the Wisconsin State Laboratory of Hygiene contain this kind of blood tube. Another kind of blood tube that is acceptable for alcohol analysis is one that has a purple stopper or cap. It contains EDTA, which acts as an anticoagulant. For drug analysis, tubes with stoppers or caps of other colors are acceptable, as long as the blood has not formed a large clot in the tube. Some tubes, such as those with red stoppers or caps, are designed to make the blood clot. These tubes are generally not useful for drug analysis because the blood is no longer in liquid form.

What is the difference between a confirmation, an identification, and a quantitation?

There is no difference between a confirmation and an identification. Both terms are used to describe the analytical procedure that investigates the chemical structure and therefore the identity of a drug present in a sample. In a quantitation, the concentration of a particular drug in a sample is determined. Many drugs are quantitated by the Toxicology Unit when they are found in blood, plasma, serum, or vitreous humor. Drugs found in urine samples are currently not quantitated. Some drugs that are identified or confirmed may not be quantitated if (1) there is no current method for doing so; (2) the drug does not appear to be present in a detrimental amount; (3) the amount of drug present in the sample is outside of the method's current quantitation range; or (4) the drug is not associated with driving impairment.

Why are drugs not quantitated in urine samples?

There are a couple of reasons why drugs are not quantitated in urine samples. The first is that the amount, or volume, of urine can vary widely. When drugs are quantitated, they are reported as a unit of weight (such as micrograms, or µg) per unit of volume (such as liters, or L). The volume of blood in an individual is relatively stable. Barring traumatic injury in which an individual loses a massive amount of blood, an individual is not able to easily alter the volume of blood in his or her body. An individual can, however, easily alter his or her urine volume. In other words, an individual can drink lots of water in order to increase the volume of his or

her urine. In doing so, any substances that are present in the urine become diluted. This could affect interpretation of any quantitative results. Specifically, it can appear that an individual only ingested a small amount of a drug when, in fact, his or her urine was simply very dilute. Another reason that drugs are not quantitated in urine samples is because any drugs found in urine are not representative of drugs that are having an effect on an individual at that given time. Any drugs found in the urine are not available to the blood system and, therefore, are not being distributed to the organs and tissues in the body. Once drugs enter the urine, they are in a sort of “holding tank” until they are disposed from the body. At this point, the body is no longer using them. Because of this, the presence of drugs in urine simply denotes past exposure.

What is the difference between a drug screen and a drug confirmation/identification/quantitation?

A drug screen is the first step in testing biological samples for drugs. At this point, no analytical information has been gathered about what, if any, drugs may be present in the sample. In an immunoassay drug screen, a sample (blood, urine, vitreous humor, etc.) is generally tested for a standard panel of drugs or classes of drugs. If the sample shows a significant response to any of these classes of drugs, it then must be confirmed or identified. An immunoassay screen does not test in enough detail for a drug to be identified or confirmed, so drugs or classes of drugs can only be indicated from this test. Further work must be done. On the other hand, screening by gas chromatography/mass spectrometry (GC/MS) is capable of identifying or confirming a drug. When GC/MS is used for screening, it can detect a larger number of drugs than the immunoassay screen. Because of the nature of the technique, it is also possible to confirm or identify a drug that is detected. Identification/confirmation/quantitation is the second step of drug testing. Because this technique provides information about the chemical structure of a substance, it is possible to definitively state the specific drug that is present. For example, if the immunoassay screen indicates that benzodiazepines are present in a blood sample, the identification or confirmation determines that alprazolam is the benzodiazepine that is present. Quantitation calculates the concentration of alprazolam that is present in the sample.

What is the difference between an indication and an identification/confirmation?

When a drug or class of drugs is indicated, it means that the specific structure of the substance could not be determined. An identification or confirmation of a drug means that the specific structure of the substance has, in fact, been determined. A drug can be indicated for different reasons. The first is that the technique that was used is not capable of determining the specific structure. An example of this is the immunoassay screening. This technique is designed only to indicate drugs or classes of drugs; it is not designed to give the specific structure and therefore identity of the substance. The second reason a drug is indicated could be that, although the technique employed gave enough information to determine the structure of a substance, no reference material was analyzed by the same technique in order to compare to the sample for verification. The Toxicology Unit will not identify or confirm a substance unless it has first been verified by comparison to a reference material, or standard.

Does the Wisconsin State Crime Laboratory test for synthetic cannabinoids in blood and urine?

The Toxicology Unit has just begun the process necessary to begin to analyze these substances in blood and urine. The Milwaukee lab has just acquired a Liquid Chromatography/Mass Spectrometry/Mass Spectrometry (LC/MS/MS) instrument. The technology in this instrument permits detection of some substances that are not detected using the current Gas Chromatography/Mass Spectrometry (GC/MS) instrumentation. The analysts must receive the necessary training and complete the required validation in order to begin analyzing case samples by this technique. This will take several months to implement, so please bear with us as we ensure

Toxicology Frequently Asked Questions

that we can provide quality testing for you. We will provide an update when the testing is ready to begin. In the meantime, if you have questions, please feel free to call.

Where may I send a sample for analysis of drugs that the Wisconsin State Crime Laboratory Toxicology Unit is not able to detect at this time?

Private toxicology laboratories may be able to help you. Please contact your local Toxicology Unit if you need more information.

What is a metabolite, and why is it important?

A metabolite is a breakdown product of a drug. When an individual takes a drug, his/her body wants to break it down so that it can eliminate it. This breaking down process is called metabolism, and the broken down substance that is produced is called a metabolite. Metabolites are important for two reasons: (1) some are pharmacologically active, meaning they also cause impairment; and (2) some parent drugs do not last very long in the body, so the presence of a metabolite indicates that the parent drug was used at some point. An example of the second point is heroin and its primary metabolite, 6-monoacetylmorphine (6-MAM). Heroin is metabolized by the body in minutes after it is injected, so it is rarely seen in a blood sample of a living individual. The presence of 6-MAM in blood, however, indicates that heroin was used recently.

Toxicology Frequently Asked Questions

How do I know whether I should send a sample to the Wisconsin State Crime Laboratory or to the Wisconsin State Laboratory of Hygiene?

The following chart should help clarify this. Please contact your local Toxicology Unit if you have further questions.

Submissions: Hygiene Lab vs. Crime Lab

Offense	Hygiene Lab	Crime Lab
Driving under the influence (DUI) Type Impaired by alcohol and/or other drugs. Includes motor vehicle deaths, snowmobiles, motorboats, and ATV's.	ALL OFFENSES Including great bodily harm, vehicular homicide.	FELONIES ACCEPTED (Including 4 th offense OWI or higher, great bodily harm, vehicular homicide)
Death Investigations	Suicides & routine death investigations. Submission is <i>not</i> limited to coroner or medical examiner; WSLH will receive samples in any death investigation.	Death is suspicious and possible FELONY CHARGES pending.
Probation and Parole Violations	Initial charge must be a MISDEMEANOR. <i>FEE is required.</i>	ACCEPTED
Crimes of Violence Domestic Abuse, Drug Facilitated Sexual Assaults, Weapons Charges	NOT ACCEPTED	ACCEPTED
Controlled Substance Cases	NOT ACCEPTED	MUST BE A FELONY Biological samples alone are not sufficient for possession charges.