



**Cansford**  
**Laboratories**  
Pioneering drug and alcohol testing

The complete  
guide to hair  
testing for  
drug & alcohol  
for Family Law

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## Chapter 1 | INTRODUCTION

In public and private law cases, the hair test is among the most powerful tools for detecting and proving alcohol and drug use over long periods.



Highly accurate and increasingly relied upon, the method is fast, proven and cost-effective. Exceptionally difficult to subvert, the process looks set to increase in popularity following its introduction in 1993.

For family law professionals considering using the test, or for those with a client accused of substance use or addiction, understanding the hair testing process and its limits is essential.

This eBook answers the most common questions about hair testing for drug and alcohol, including:

- When hair testing is useful
- How hair testing works
- The limits of accuracy within hair testing
- How to choose a reliable hair testing lab
- How long hair tests take and how much the process costs

We hope you find our guide useful.

**Cansford Laboratories**

## Chapter 2 | HAIR TESTING VERSUS OTHER DRUG TESTING METHODS

Detecting drug and alcohol use can be done in several ways, including by hair testing, blood testing, urine testing, saliva (oral fluid) testing and transdermal alcohol testing.

Sampling methods should be chosen based on the time and duration of drug and alcohol use to be detected.

A judge may request a defendant be screened for cocaine use in the past two months. In this case, a hair test offers the widest window for detection and would be the best choice. If the defendant has a history of drug abuse and the judge decides they must be monitored for use after their court appearance, repeated urine testing or oral fluid testing conducted over the following two weeks would be more appropriate. Unlike hair tests, urine tests detect substance intake over days, not weeks. Alternatively, a single hair test performed a month after suspected use will provide the answer required by the court.

Crucially, hair testing should be used with other testing methods when the drugs or alcohol to be detected were used by the donor less than a week before the test. Traces of substances only show above the scalp after approximately seven days; using a secondary testing method therefore provides a full picture of a donor's substance use.



The table below outlines the advantages and disadvantages of each of sampling method:

Test	Collection procedure	Window of detection	Advantages	Disadvantages	When to use
Hair test	A sample of hair is cut, usually the thickness of a shoelace. If the donor has no hair on their head, sample will be taken from elsewhere on the body.	Typically for alcohol: 0 – 6 months  Typically for drugs: 7 days – 12 months	Able to detect usage over long periods  Non-invasive collection  Difficult to subvert test	Cannot indicate precisely the amount of drugs used.  Cannot assess acute drug intake. Substances take one week to appear on scalp.	When an individual is accused of long-term substance abuse and assessment is required to go back months  Useful for pre-employment tests
Blood test	Using special medical equipment, a sample is taken from the donor	Immediate: detects substances currently in the donor's system	Most effective method for assessing substance use in-the-moment  Well-established method	Most invasive collection method  Requires special equipment and a trained phlebotomist	When individual is accused of substance use in past days
Urine test	The donor is asked to urinate into a cup, possibly with supervision to prevent tampering	0.5 – 5 days (although some substances can stay in donor's system longer)	Able to assess acute drug intake  Cost-effective test method  Large specimen volume enables retesting	Medical condition or shy bladder may prevent donor from producing sample on demand  Samples can be tampered with (including dilution using water)	When an individual has a history of substance use and must be tested over a long period to monitor for abuse. In this case, multiple tests should be taken over a period of weeks.  Often used in pre-employment and workplace testing
Oral fluid (saliva) Test	An absorbent material is pressed into the mouth to take sample	0 – 2 days	Simple collection method  Low risk of tampering	Low volume of sample means retesting is difficult  Donor anxiety can cause dry mouth and make collection difficult	Often used to confirm results of other types of test  Often used in pre-employment and workplace testing



## Chapter 3 | HAIR TESTING FOR PRIVATE AND PUBLIC LAW CASES



### Permission to use hair testing

Hair tests can be used to demonstrate drug or alcohol use in both public and private cases.

In a public law case where allegations of drug or alcohol use have been made, the party making the allegation must obtain the permission of the court to conduct a hair test. The court order may stipulate that the test is conducted under certain conditions.

For example:

- That a particular type of test is used –  
i.e. a hair test or an oral fluid test
- That the test is made for a specific substance
- That the test cover a stated period. Courts often ask that tests assess three months of substance use preceding the test date.
- That sectional or overview testing is carried out.
- Sectional testing requires separate tests for different periods within a timeframe – for example, for three separate months in a three-month timeframe. Overview testing assesses substance use at any point in a timeframe – for any substance use in a three-month period, for example.

In private law cases, parties may choose to undergo a hair test without being ordered to do so by the court.

### Admissibility of evidence

In public cases where tests have been ordered by the court, the hair test result automatically stands as evidence in the court.

In private cases where parties have chosen to conduct a test but have not been ordered to do so, parties must apply for permission to use the test result as evidence in court.

### Paying for hair tests

In a public law case, legal aid may be used to cover the cost of the test. According to the Legal Aid Agency (LAA), payment is likely to be withheld if the test is conducted outside the conditions for the test stipulated by the court.

In a private law case, the litigant will be expected to fund the drug or alcohol test themselves.

Test costs are discussed in Chapter 6 of this book.

### Concluding care proceedings

Care proceedings in public law cases must be concluded within six months. As such, tests for substance use must be carried out quickly.

Accurate hair tests can be completed within three days. Speed of testing is discussed further in Chapter 6 of this book.

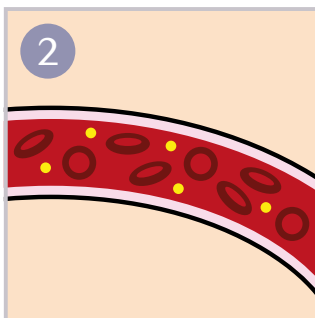


## Chapter 4 | HOW HAIR TESTING WORKS

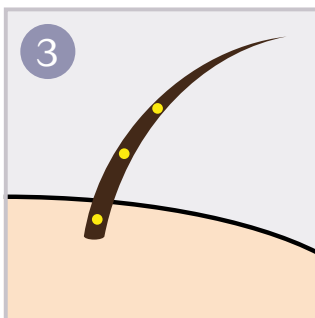
### How does hair testing work?



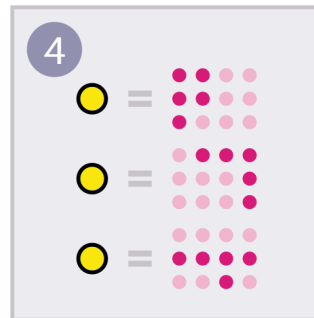
1 On consuming alcohol and certain drugs, the body breaks down the substances into metabolites.



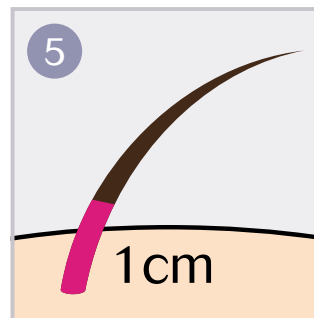
2 Drugs and metabolites circulate in the bloodstream.



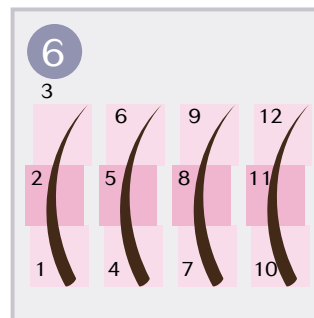
3 The drugs and metabolites are then transferred into hair fibres on the scalp and elsewhere.



4 Each drug detected in the hair has its own chemical 'fingerprint'. When tested by a laboratory, the presence of a metabolite in a hair sample indicates if and when a person has ingested the substance over a period.



5 Hair on the human scalp typically grows one centimetre each month. As such, a three centimetre strand of hair can be tested to accurately reflect drug and alcohol use over approximately three months.

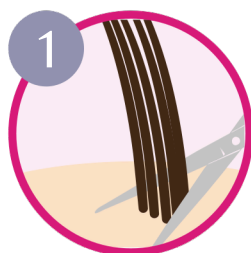


6 The detection timeframe determines the amount of hair required for testing. If a subject is bald, hair from their body can be used instead.

Using hair-testing, it's possible to reliably detect substance use across a 12-month period. In the past, the technique has been used to gauge cocaine and heroin use after 24 months.

## The sampling and testing process

Hair samples are collected and tested as follows:



1 Under controlled conditions, a sample of hair – usually the thickness of a shoelace – is cut from the scalp.



2 This is sent to the laboratory via post where it is logged in a computer system.



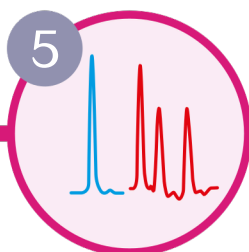
3 The sample is washed to remove chemical deposits on the outside of the hair. Once washed, the hair is disintegrated via chemical or mechanical processes to extract the target substances.



4 The sample may be screened for the target substance using an immunoassay, before using a more specific second test. At Cansford Labs, we subject the sample to LC-MS/MS in the first instance (liquid chromatography with mass spectrometry).

This separates the compounds in the extract, identifying traces of cocaine, heroin and other specified substances

beyond any margin of doubt.



5 Laboratories will finally compare the result of the sample against a control sample to determine how much drug is present in the hair.



6 Results are then reviewed by a second toxicologist to prevent misinterpretation. Test results are issued via a certificate of analysis, which states the amount of substance present in nanograms per milligramme of hair. If necessary, the laboratory will also produce a witness statement, including a description of the testing process and their interpretation of the result, in linguistic terms

everybody can understand.

### Who can collect a sample?

In the first instance, the person conducting the hair test is responsible for the reliability of the hair test.

Laboratories will often suggest that a trained collector or a GP take the hair sample from a donor. In the latter case, a sampling kit will be sent to the doctor's surgery.

Official identification of the donor must be provided.

A reliable witness may also be present to guarantee the reliability the sampling process.

Once the sample has been taken, the collector will wrap hair sample in foil, and store the sample in a tamper-proof envelope. The sample can be dispatched by post to the laboratory, where trained laboratory staff will check all seals on the sample to ensure its legitimacy, and that the chain of custody has not been broken in transit.



## Chapter 5 | TEST ACCURACY, AND HOW RESULTS ARE INTERPRETED

Hair testing is a robust, reliable scientific testing method, provided that the context for the sample is known to the laboratory scientist performing the test.

This is important: given their scientific nature, hair testing results must be interpreted by a toxicologist before they can be used as evidence in a court. The toxicologist must have confidence in their results and be able to trust the chain of custody for the sample.

This is because a number of factors can affect the accuracy of test results.

- The person taking and handling the sample must be able to prove the sample is from the correct person. In the past, laboratories have been sent hairs from hairpieces and donors' twin siblings. For this reason, many labs recommend their trained collectors or a GP take the samples. Donors should supply official photo identification before giving a sample, and a reliable witness should be present to sign documentation verifying the sampling process.

- The donor's use of medication must be known. Some types of medication – including codeine – can give the appearance of drug use. Knowing when medication was taken is essential as this helps the toxicologist to look for patterns in a donor's test results, against other substance use.
- Hair samples can be damaged using bleach. The donor may repeatedly bleach and wash their hair to attempt to remove traces of substances from their scalp.
- **Hair colour also affects trace levels in a sample**, because some substances bind with the melanin in dark hair more than in lighter hair.

Finally, it's important to know that levels of a substance do not fall immediately after a donor stops using it. In practice, drug and metabolite levels drop to 10–20% of their previous amount but traces will still be present in hair samples up to four months after use ends. As such, a repeat hair test will be necessary to demonstrate that a donor has stopped using alcohol or drugs altogether.



## CASE STUDY

A female donor with a history of drug use presented a fair hair sample for testing. The donor's social worker recognised that the donor was a natural brunette and alerted the toxicologist. Two weeks later, the social worker sampled the woman a second time in an unannounced test. This second sample proved positive for illegal substances. The donor was found to have dyed her hair before the original test to avoid detection.

## Interpreting results

The laboratory providing the hair test must have information on the factors above to interpret donors' test results correctly. As such, they require the support of those working with the donor. Moreover, the laboratory conducting the hair test should declare when doubt exists about the result in question.

As well as considering factors which can affect a hair test result, the laboratory performing the test must also determine when a positive result indicates actual substance use, as opposed to a contamination of the sample. For this laboratory teams use analytical and user cut-offs.

## Cut-offs come in two forms:

An analytical cut-off indicates when the level of a substance in a sample is significant enough to be reliably detected by the analytical method used. As such, these cut-offs vary between laboratories, according to their method.

The user cut-off indicates that an individual has a substance in their system and not from environmental contamination. For example, it's possible to detect traces of cannabis in a donor who has not used the drug but which has been in a room where others have been smoking the substance. In conjunction with the detection of metabolites, this second cut-off helps toxicologists with the interpretation of test results.

It's important to note that testing cut-offs vary according to several factors. These include:

- **Different drug types. For example, the** cut-off for cocaine in hair samples is 0.5 nanograms/per milligramme (ng/mg), yet the cut-off for the metabolite of THC (the main component of cannabis) is 0.002 ng/mg of hair.
- The type of test. Urine tests involve different cut-offs to hair tests.
- **The analytical method used. A hair testing** laboratory using the chromatographic method will have different cut-offs to one using an immunoassay technique for screening.

### CUT-OFFS IN ACTION

Cocaine use can be determined when cocaine levels in a hair sample are above 0.5 ng/mg and metabolites are present in significant amounts. When levels of cocaine are below 0.5 ng/mg and the metabolites are not detected, the toxicological interpretation is different, and must depend on the history of the case. Only competent laboratories are able to interpret results in such cases.



### Individual differences

Interpreting the results of a sample from two donors requires expert knowledge. Individuals 'take-up' substances at different rates and therefore exhibit different levels of that substance in their body, even when the amount of substance ingested was the same for both.

As such, individual donors act as their own control. It's therefore possible to tell whether a donor has ingested more or less of a substance over a period or whether they've changed their target substance.

### CASE STUDY

A male and female couple used the same drugs, prepared in the same way. The laboratory results of a hair test found that the female's blond hair had fewer traces of the substance than her partner's dark hair. Without proper interpretation, a lawyer may have mistakenly assumed the male had used more drugs than the female.



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## Chapter 6 | CHOOSING YOUR LABORATORY

Given that hair test laboratory results must be expertly interpreted, the accuracy and reliability of hair tests vary between laboratories. As such, choosing the right hair testing laboratory is key.

Family lawyers should select their laboratory **witness based on proficiency, speed, cost, accreditation and – most importantly – result accuracy.**

### Proficiency

Proficiency schemes indicate the credibility and accuracy of a laboratory's test procedures for particular substances. In the UK, the Society of Hair Testing (SoHT) provides a standardised proficiency scheme for laboratories working in forensic and clinical cases.

To pass a proficiency test, a laboratory will test a control sample and have their result screened against other laboratories within the scheme who tested the control sample. As such, successful participation within a scheme indicates a minimum level of accuracy and reliability on the part of the laboratory.



# The complete guide to hair testing for drug & alcohol

## for Family Law

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### Speed and cost

The time it takes to test a sample varies from laboratory to laboratory, from three working days to two weeks after the sample is received.

The cost of a hair test is more complicated and can be affected by factors including:

- The number of substances being tested for
- The window of detection being tested for.

A longer period with multiple required testing points will be most expensive.

Depending on these factors, a hair test will typically cost between £160 and £200 including collection of the sample. This said, cost should not be a lawyer's sole consideration when choosing a laboratory. Of more importance is that the test is reliably conducted and produces results that will hold up in a courtroom.

### Accreditation

Like all laboratories in the UK, hair testing labs must be accredited to minimum standards set by the UKAS (United Kingdom Accreditation Service).

As a minimum, your laboratory should hold an ISO/IEC 17025 rating. This standard addresses laboratories' competence to use valid sampling and testing methods to produce precise, accurate and reliable results.

Crucially, an ISO/IEC 17025 rating does not cover all the types of test a laboratory performs. For hair testing, this means laboratories will be accredited for testing certain substances but not others.

When a judge orders a hair test, it's important to ensure the labs under consideration are accredited to test for all substances in question. This information can be found on the UKAS website.





Following is a list of drug groups and specific drugs a laboratory may be accredited to test for:

- Cocaine group: Benzoyllecgonine, Cocaine, Cocaethylene, Norcocaine
- Opiates group: 6-Acetylmorphine, Codeine, Dihydrocodeine, Morphine, Heroin
- Methadone group: Methadone, EDDP
- Tramadol group: Tramadol, Desmethyl Tramadol
- Amphetamine group: Amphetamine
- Benzodiazepines group: Diazepam, Nordiazepam, Lorazepam, Nitrazepam, Oxazepam, Temazepam
- Cannabinoids group: THC, Cannabinol, Cannabidiol, THC-Carboxylic Acid (THC-COOH)
- Mephedrone group: Mephedrone
- Methamphetamine group: Methamphetamine, MDMA, MDA, MDEA, MBDB
- Ketamine group: Ketamine, Norketamine
- Alcohol markers: ETG, FAEE (Ethyl-Myristate, Ethyl-Oleate, Ethyl-Stearate, Ethyl-Palmitate)

## Accuracy in procedure and reporting

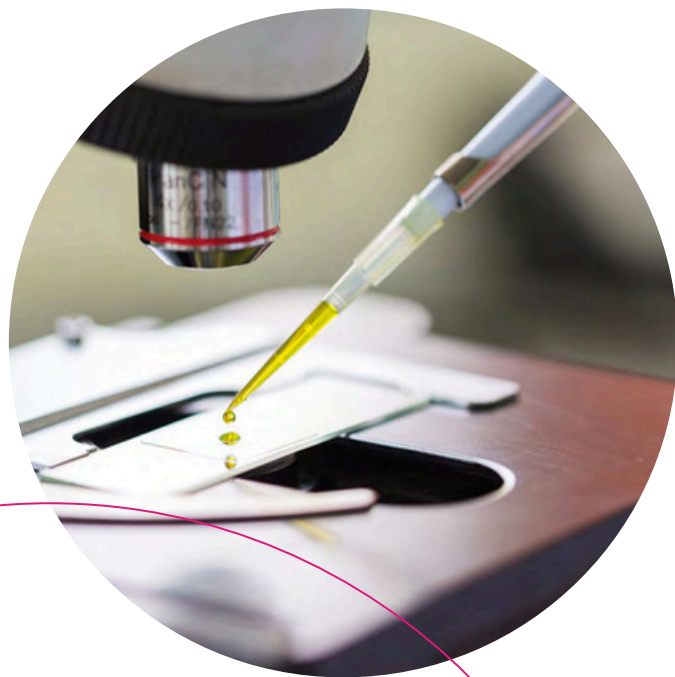
The differences in testing and reporting methods used by laboratories cause the accuracy of their results to vary.

Some laboratories, including Cansford Labs, use liquid chromatography as their primary testing method. This is a highly reliable process which uses a physicochemical test to identify the mass spectrometric fingerprints of substances used by a donor. The speed of the test depends on how advanced the laboratory is.

Others conduct an immunoassay test followed by a physicochemical test. The immunoassay provides an overview of whether or not a substance is present in the sample. This is confirmed by the physicochemical test. In the past, laboratories have failed to conduct both halves of the test, declaring a 'presumptive positive' as a final result. This is misleading; as such, it's important to know which type of method a laboratory uses before selecting their services and presenting their findings as evidence.



## Chapter 7 | FAQs



### Q. Is it possible to test for substances week by week?

Yes; some laboratories will conduct hair tests on three millimetre-long hair samples when an allegation of specific substance abuse is made – for example, if a donor had their drink tampered with. In this case, the test result will show a spike in concentration of the substance.

Testing a three millimetre section of a hair sample is not precise enough to indicate substance use on an exact date, but is useful to indicate an exceptional instance within a pattern of drug use.

### Q. Can anybody take a hair sample?

In short, yes. The collector must be able to guarantee the integrity of the sample to generate an accurate test result, however. For this reason, relatives or friends of a donor should not be employed as collectors. A GP, solicitor or other professional is acceptable. We recommend a trained collector is employed to take the sample.

For all collections by untrained collectors, the hair testing laboratory should provide instructions with detailed schematic drawings.

**Q. Can a hair test categorically prove that a donor has stopped using a substance?**

Immediately after they've stopped using a substance, a heavy drug or alcohol user will still present 10–20% of their previous level of that substance in their sample. This is because it takes three to four months for traces of a substance to disappear from new hair.

As such, it may be necessary to retest a donor after three to four months to prove they have finished using a substance altogether.

**Q. A 2 ng/mg trace of MDMA has been found in a hair sample. How much of the substance did the donor take?**

Making a judgement of this kind is not possible for two reasons. Different people take up substances at different rates, so each person acts as their own control. Furthermore, the purity of a drug ingested affects the amount present in a donor's sample. Therefore, no single standard of substance concentration exists.

**Q. Two donors claim to have used the same amount of drugs, but the results from their hair tests are very different. Is one lying?**

It's possible both donors are telling the truth because metabolites pass into hair fibres at different rates. If one parent was fair-haired and the other dark, a toxicologist would expect to find higher substance levels in the darker hair sample. Other variables affect uptake and would be considered by the laboratory conducting the test.

If both donors claimed to be taking similar amounts of drug at the same time but the test results demonstrated different patterns of use, it's reasonable to ascertain that one or both of the donors is lying.



## Chapter 8 | CONCLUSION

Fast, accurate and economical, hair testing is an essential asset to law professionals in public and private cases. Yet the limits of the method must be well understood. Tests must be carried out under controlled conditions and results must be interpreted by expert toxicologists. For as long as this remains the case, the method will continue to be an invaluable tool in courtrooms across the UK.

For more information about hair testing, visit [cansfordlabs.co.uk](https://cansfordlabs.co.uk)

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## Chapter 9 | THE ROOTS OF HAIR TESTING

Drug testing extends  
back to the early  
twentieth century.



In the late 1970s, drug detection in urine samples sped up thanks to the new enzyme multiplied immunoassay technique developed by the Syva Foundation. This expanded the use of blood and urine drug testing into therapeutic applications – tracking whether patients were taking the right amount of anticonvulsant drugs, for example. Syva's technology also proved useful when testing for substance abuse.

Doctors John Wicks and Lolita Tsanaclis, the team behind Cansford Labs, built on Syva's work and pioneered hair testing as a detection method in 1993. Having researched and proved their method, the pair first used their technique in a family care court two years later, before expanding their sampling service to the employers, clinics, schools and government bodies throughout the UK as TrichoTech Ltd. By 2000, hair testing had become routine in courts across the country.

Since 1993, the team around John and Lolita have refined the hair testing method to offer an unrivalled sampling service. Then, testing took up to ten days – still an industry standard. Today, Cansford provide an improved testing regime that delivers results in three days, with no loss in accuracy. The Cansford team is based in Cardiff, UK, with a partner laboratory Chromatox in Sao Paulo, Brazil.





**Cansford  
Laboratories**  
Pioneering drug and alcohol testing

To find out more or enquire about hair drug & alcohol testing:

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**Call: 029 2054 0567**

**Visit: [cansfordlabs.co.uk](http://cansfordlabs.co.uk)**