

What's Wrong with Current Practices of Hair Strand Testing

*How To Best Challenge **Disputed** Results To Get the Best
For Your Client*

The Observer Family law

Children taken away from parents due to misreporting of drug tests, say experts

Process for interpreting hair-strand tests can be misleading and carries a risk of racial bias, according to campaigners in England and Wales



Life-changing decisions about whether a child should be placed in care can hinge on hair-strand tests. Photograph: Jose Luis Pelaez Inc/Getty Images

Hannah Summers

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Children are at risk of being wrongly removed from their parents' care by the family courts because drug tests are being misinterpreted, experts have warned.

Life-changing decisions about whether a child should be placed in the care of a local authority can sometimes hinge on the outcome of hair-strand tests,



1.24 JUSTICE X FAMILY COURT FILES

PARENTS 'LOSING THEIR CHILDREN' OVER MISINTERPRETED DRUG TESTS

Open letter calls for reform of how hair strand tests are used in court

We expose injustice and spark change. Help change the world by becoming a Bureau Insider

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At a glance

- Hide

- Test results are used as evidence in major decisions on child welfare
- Discrepancies in how results are interpreted creates risk of racial bias

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Legal
Principals
Re D [2024]

**D, Re (Children Interim Care Order Hair Strand Testing)
[2024] EWCA Civ 498 (10 May 2024)**

- It is still an evolving field, and, as previous case law has cautioned, hair strand testing has its limitations.
- The variability of findings from hair strand testing does not call into question the underlying science but emphasises the need to treat data with proper caution.

RE H (A Child) [2018]

- **Re H (A Child: Hair Strand Testing) [2017] EWFC 64, [2018] 1 FLR 762 Peter Jackson J**
- Most of the information is factual, and in some cases it will be interpreted by experts, who will **express an opinion**. That will be the case when scientific investigations such as hair strand tests are carried out.
- I would suggest that reports record all findings,
- It is at the interpretation stage where the results can be judged in the full context of the case and all associated influencing factors.

Other messages from case law

- There is a risk that the results will acquire a pseudo-certainty, particularly because (unlike most other forms of information in this field) they appear as number (**re H**)
- Three experts could not agree on what the findings meant (**Re H**)
"there are variables in relation to hair colour, race, hair condition (bleaching and straightening damages hair), pregnancy and body size. Then there are the variables inherent in the testing process."
- Three experts in case agreed hair strand testing **should never be regarded as determinative or conclusive** (London Borough of Islington v M and another [2017] EWHC 364 (Fam) (Hayden J))

Guidance from TIAFT 2019

- Professor A. Robert W. Forrest presented a paper; 'Hair Strand Analysis Evidence in Court' which concluded:
 - ***“Toxicologists reporting hair strand analysis results should move away from simply providing results by the application of cut-offs, to a process of assisting the Courts as experts by providing data supported, evidence-based opinions.”***

Is HST Evidence Reliable

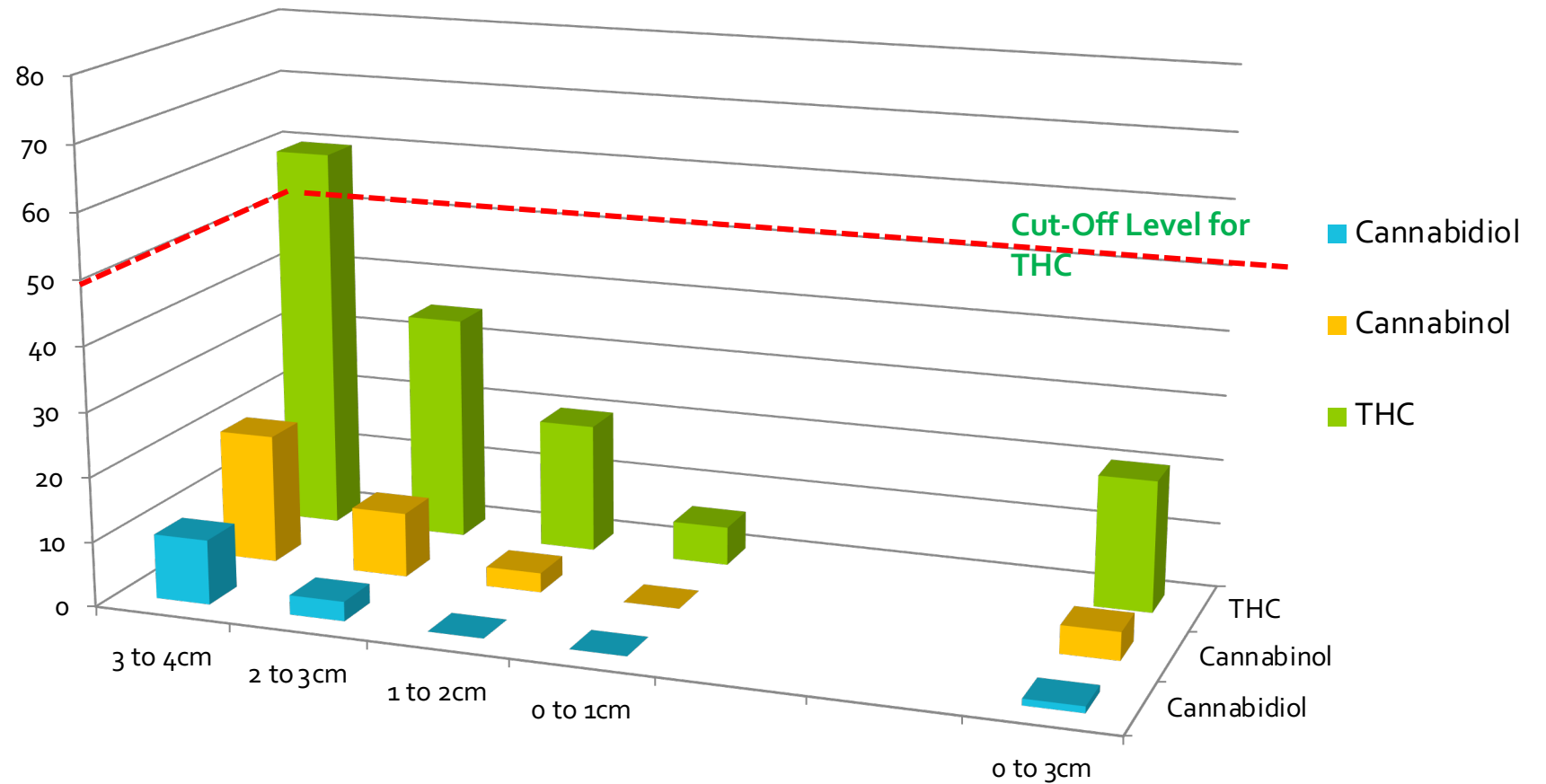
- The science supporting hair testing is well established and reliable
- **Test results** can be considered as **factual evidence**
- **Interpretation** of test results is **expert opinion evidence**
- For reliable opinion evidence, the expert must establish and consider all prevailing context, influences and chain of evidence that impact results and interpretation in each case
- If the testing laboratories use cut-offs and rely on the test result in isolation to form their opinions, the evidence will be unreliable

Why Cut-offs Fail - No Chain of Evidence



Why Cut-offs Fail –
All Drugs are
Different

Cannabis Profile – Regular user



Why Cut-offs Fail – Hair colour

Codeine Concentrations

Black
1134.0



Brown
250.8

SoHT reporting

Cut-Off 200 pg/mg

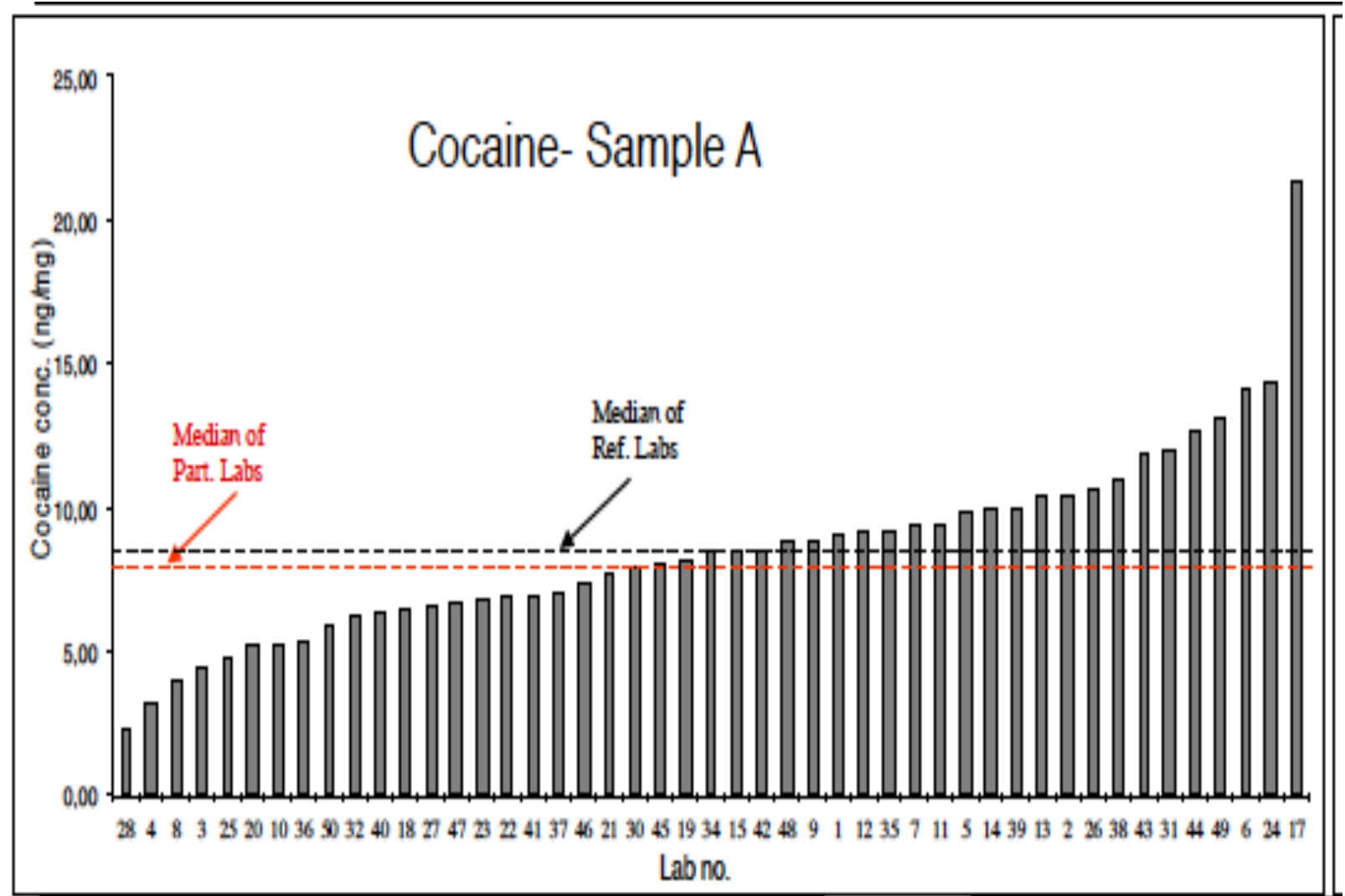
Blonde
119.6



Red
66.6

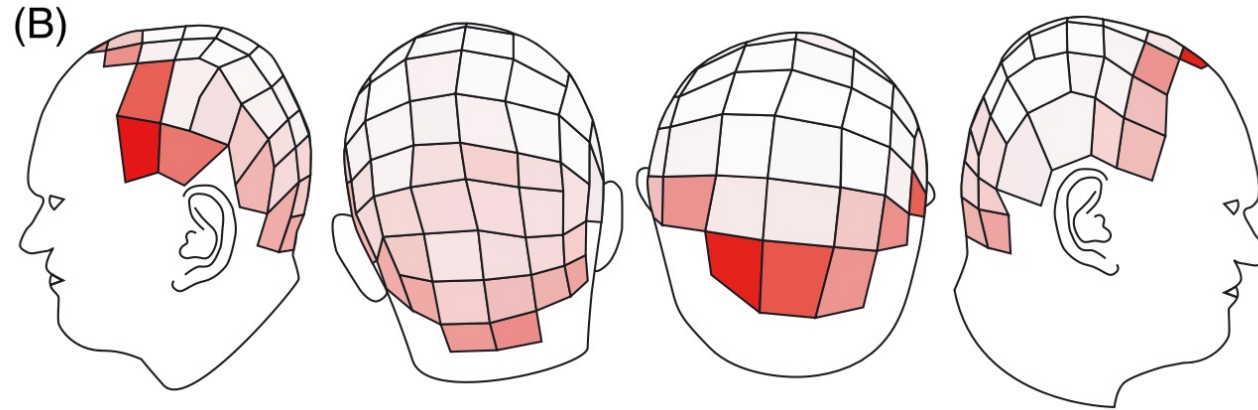
(pg/mg hair)

Why Cut-offs Fail – Lab variation

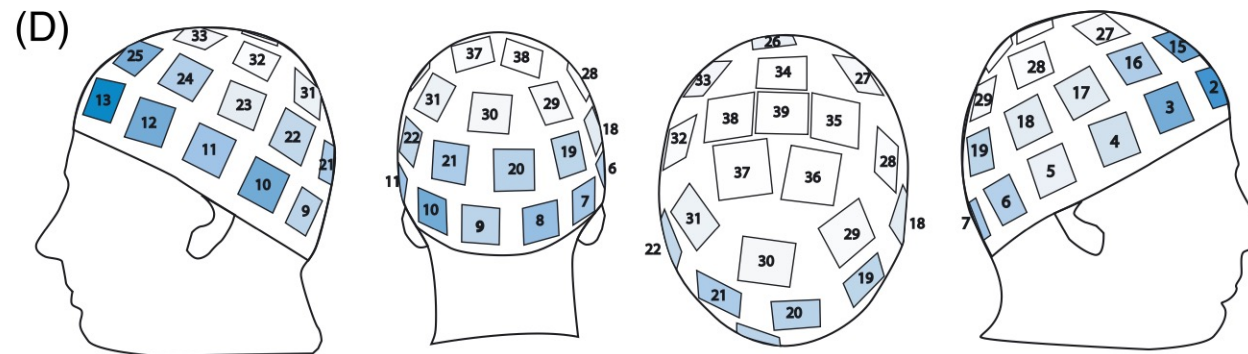


Why Cut-offs Fail – Hair collection site cocaine

Distribution of **Cocaine** Levels



Distribution of **Sweat** levels



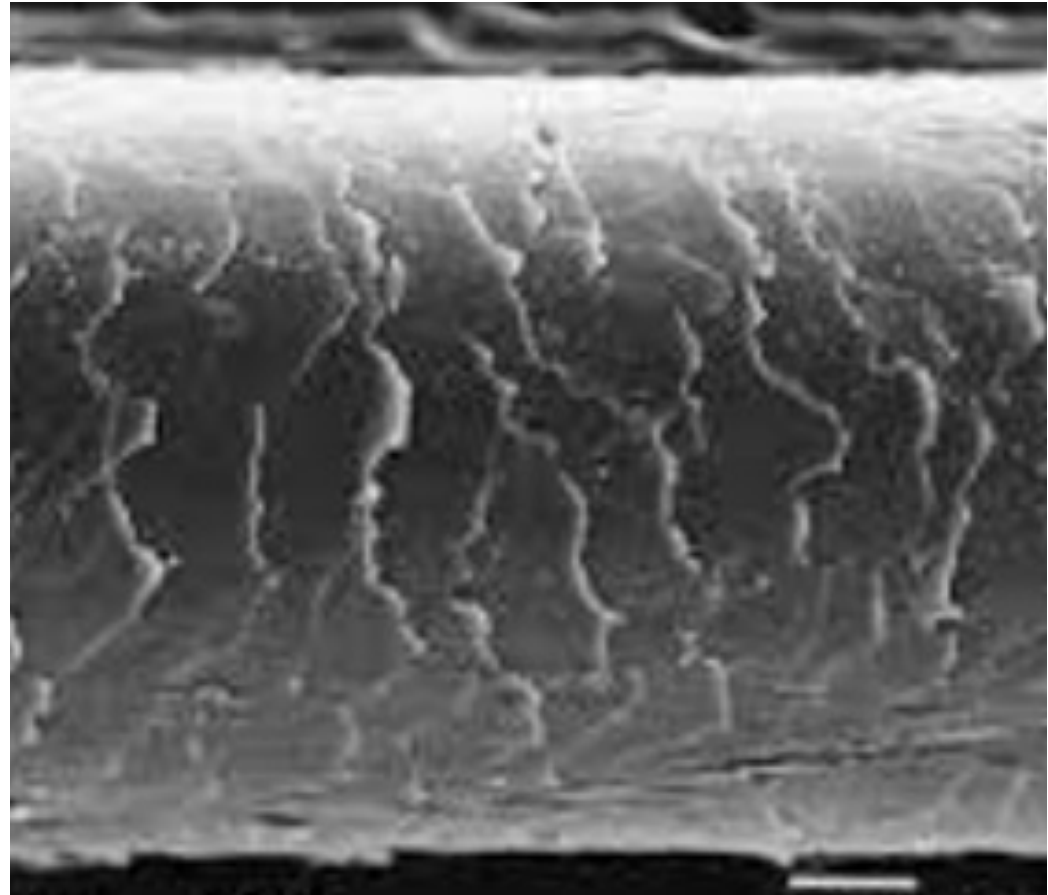
- Variability of up to 105-fold difference in level reported
- Up to ~10-fold difference on adjacent sites
- Different for different drugs

Hair dye

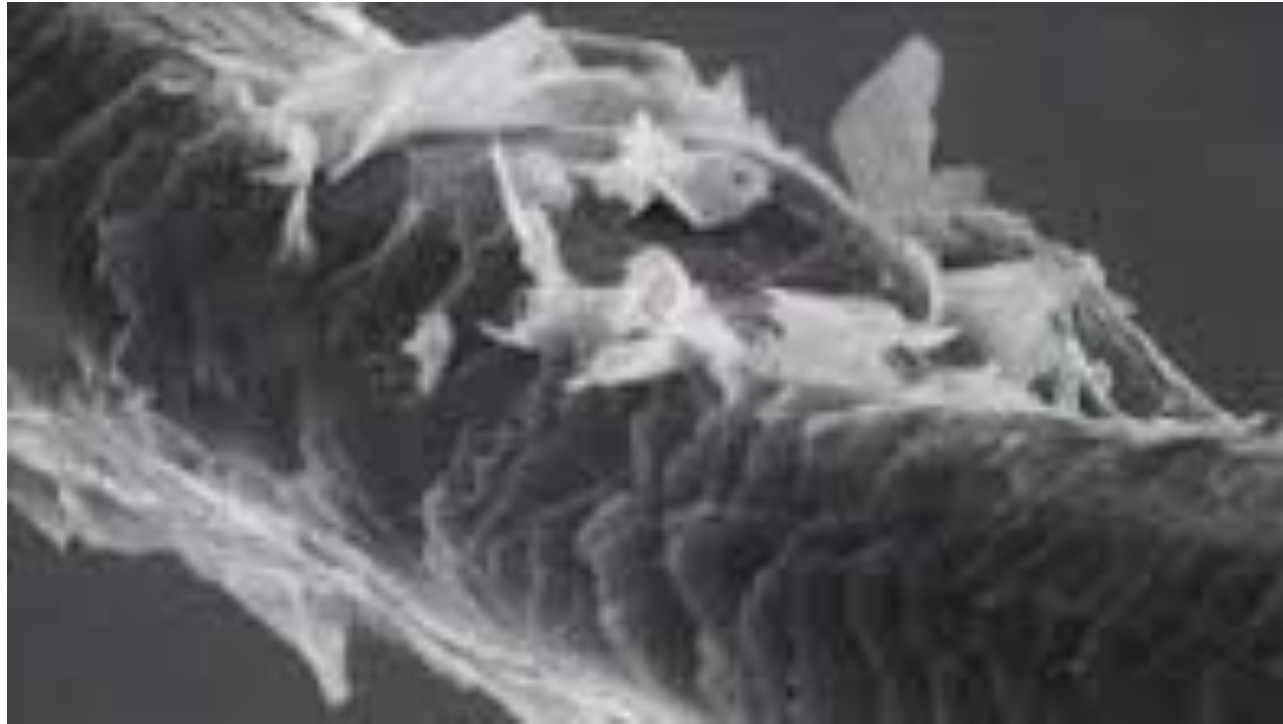
Bleach and Permanent Hair Dye
can remove up to 80% of drug
from hair

Drugs transferred along the hair

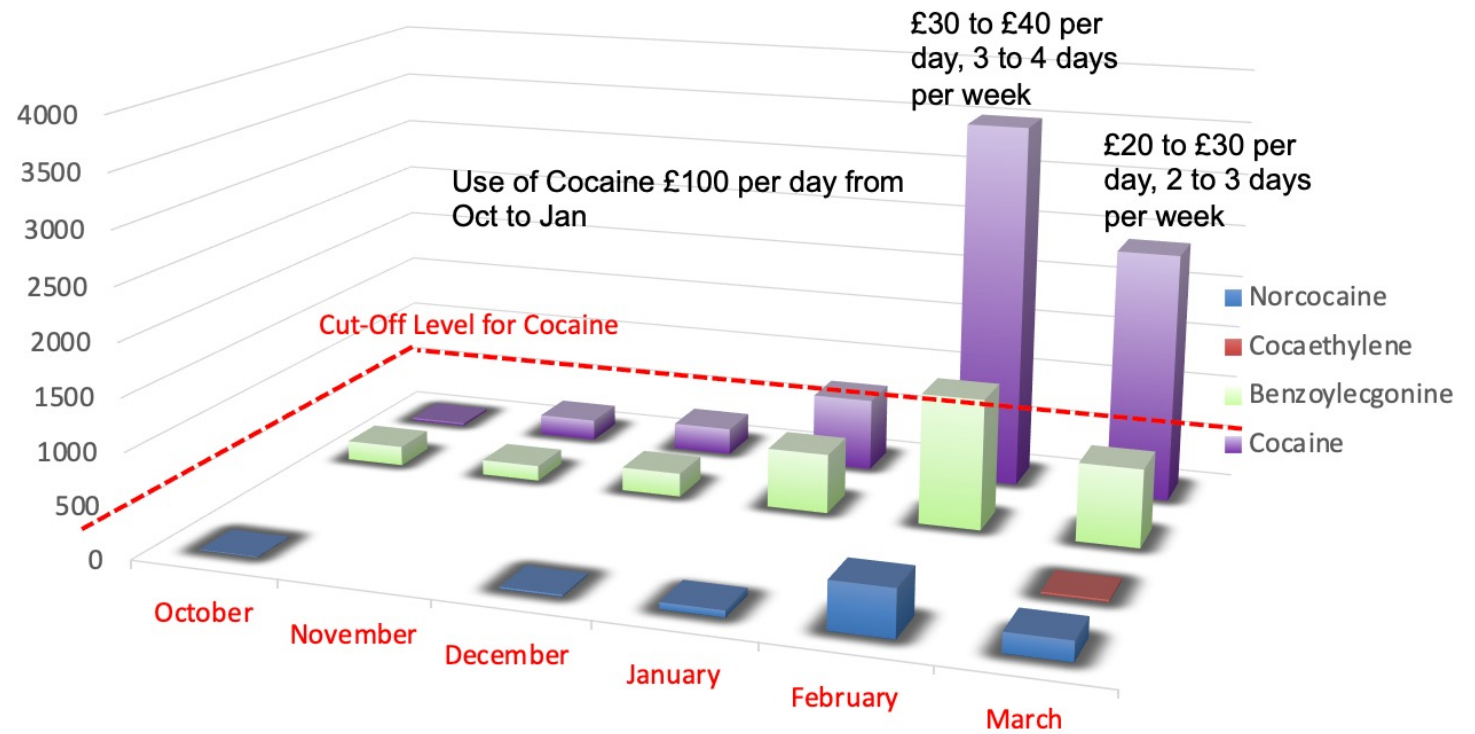
Drugs absorbed into the hair



Thermal
straighteners
- damage
- AEME –
“crack”



Impact of dye and thermal treatment



Cut offs – false reporting of drug users and non-users

Applying **SoHT Cut-offs** to results of ~3000 FTS hair samples from cases with known and supported outcomes

| | Industry Interpretation |
|--|-------------------------------|
| ~12% hair samples cases 'not' using Heroin | 'Positive' Chronic use |
| ~18% hair samples cases 'not' using Cocaine | 'Positive' Chronic use |
| ~22% hair samples chronic Heroin users | 'Negative' No use |
| ~20% hair samples chronic Cocaine users | 'Negative' No use |
| ~60% hair samples chronic Cannabis users | 'Negative' No use |

How to challenge this evidence

Instruct it properly from the start

Expert opinion evidence

Part 25, letter of instruction

Don't tell the expert how to do their job!

The expert will test the samples required

How to challenge disputed result

- **“It is at the interpretation stage where the results can be judged in the full context of the case and all associated influencing factors.” – RE H**
- - has the expert established and considered all influencing factors?
Or applied a cut off?
- - are their relevant factors that have been ignored?
- - research – if in doubt ask for supporting data and/or publications
- - Family Law Journal Articles
- - Coram resources



Critical analysis of forensic cut-offs and legal thresholds: A coherent approach to inference and decision



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ABSTRACT

In this paper we critically discuss the definition and use of cut-off values by forensic scientists, for example in forensic toxicology, and point out when and why such values – and ensuing categorical conclusions – are inappropriate concepts for helping recipients of expert information with their questions of interest. Broadly speaking, a cut-off is a particular value of results of analyses of a target substance (e.g., a toxic substance or one of its metabolites in biological sample from a person of interest), defined in a way such as to enable scientists to suggest conclusions regarding the condition of the person of interest. The extent to which cut-offs can be reliably defined and used is not unanimously agreed within the forensic science community, though many practitioners – especially in operational laboratories – rely on cut-offs for reasons such as ease of use and simplicity. In our analysis, we challenge this practice by arguing that choices made for convenience should not be to the detriment of balance and coherence. To illustrate our discussion, we will choose the example of alcohol markers in hair, used widely by forensic toxicologists to reach conclusions regarding the drinking behaviour of individuals. Using real data from one of the co-authors' own work and recommendations of cut-offs published by relevant professional organisations, we will point out in what sense cut-offs are incompatible with current evaluative guidelines (e.g., [31]) and show how to proceed logically without cut-offs by using a standard measure for evidential value. Our conclusions run counter to much current practice, but are inevitable given the inherent definitional and conceptual shortcomings of scientific cut-offs. We will also point out the difference between scientific cut-offs and legal thresholds and argue that the latter – but not the former – are justifiable and can be dealt with in logical evaluative procedures. © 2018 Elsevier B.V. All rights reserved.

1. Introduction

Many analytical branches, in particular forensic toxicology, commonly rely on what are called cut-offs. These are numerical values against which measurements – known as sets of results – made on questioned items (specimens) are compared in order for scientists to proffer, support or complement an interpretation or a conclusion in a forensic toxicological assessment regarding, for example, a person of interest.¹ Examples for sets of results are concentrations of toxic or controlled substances in blood, or of

target substances (e.g., metabolites) in hair. Such analyses are of wide interest and include, for example, workplace safety contexts, child custody disputes and sports (e.g., suspected doping cases). A further area where cut-offs are used is ink dating in forensic document examination. In this context, a numerical value for an ageing parameter – referring to certain components of ink entries (e.g., solvents) – is compared against predefined values in order to reach a conclusion regarding the ink entry's age (see [7] for an example).

In forensic toxicology, the intended use of scientific cut-offs can, broadly speaking, be summarised as follows: individuals of a group with a particular behaviour (e.g., abusive drinkers, doping athletes) can be shown to exhibit detectable features that are not – or less – typically found with people who do not belong this group (e.g.,

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Challenge the
expert

Resources

- Coram Resource pages
- videos
- Sample LOIs
- Order
- Articles

- Resolution podcast

- Family Law Journal Articles (July 23, August 24)