

Best Practice for HST Evidence PLO and Court



Forensic Testing Service

clear evidence - expertly delivered

www.forensic-testing.co.uk

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and

Why this Evidence Should Be Challenged



Dedicated to Family Law & Child Protection

- 14 years developing Best Practice in Care Proceedings
- Supported by Senior Judges, Barristers, Family Solicitors and Local Authorities
- 13 Experts, combined experience >75 years in this sector
- Forensic Laboratory based in Mirfield West Yorkshire
- Offer the most comprehensive and current range of drugs in HST in the UK
- UKAS 17025 accredited and compliant with latest European Lab 51 standards
- Certified by **Society of Hair Testing** and **Society of Toxicological Forensic Chemistry**
- Home Office Licensed
- Operate Forensic standard, mobile collection clinics across the UK
- Parliamentary Review Committee Best Practice Representative from 2020



Drugs and Alcohol

Are these a factor in the parent's ability
to provide a safe environment for the child?

- Test results in isolation can't answer this question
- Test results are only one piece of a large jigsaw
- Without the rest of the jigsaw, interpretation of test results and opinions are unreliable and misleading



Is HST Evidence Reliable Today?

- **The science** supporting Hair testing is well established and **reliable**
- **Test results** can be considered as ‘**factual evidence**’

But

- **Interpretation** of test results is **expert opinion evidence**

Therefore

- **Interpretation** must establish and consider all prevailing context, and influences that impact results and interpretation in each case

However

- The testing laboratories continue to rely on the test result in isolation to form their opinions, ignoring known influences and context



Industry Reporting Process ~30yrs Old!!

- Our knowledge and understanding has grown exponentially since then
- However, this knowledge is still ignored by laboratories when interpreting results
- Testing companies report Test Results by applying a rigid cut-off level:
- Crude attempt by SoHT to differentiate **Drug Use** from **Passive Exposure**

Result above cut-off level = 'Positive' = Chronic drug/alcohol use

Result below cut-off level = 'Negative' = No evidence of drug use

- Intended as general guidelines for non-specialist labs
- This process does not require Expert intervention and is not opinion evidence
- Sometimes useful for Workplace, Clinical and Epidemiological testing
- It should have no place to used for evidence in court or PLO process

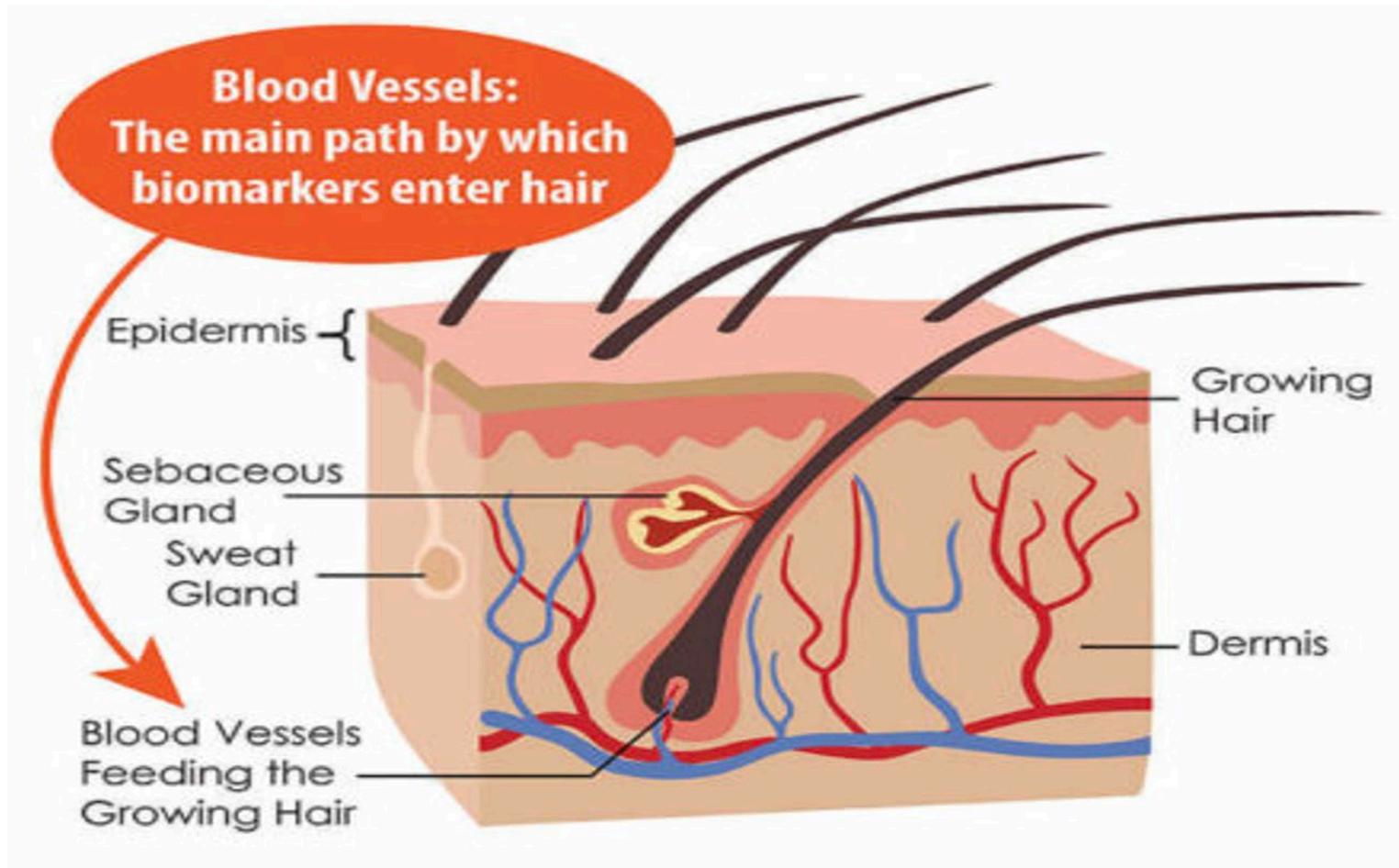


So Why does this Process Fail

- Interpretation and reporting by use of Cut-Offs ignores:
 - All prevailing influences (Hair colour, Hair hygiene, Hair treatments, Environment etc.)
 - All relevant context (previous history, changes in living environment, social patterns, etc)
 - Crucial Chain of Evidence (HD photography collection process, Observations, etc.)
 - All previous comprehensive case data files (Results with all above for each case)
- Results in misleading interpretations, misreporting and miscarriages of justice
- Industries use of High, Medium and Low descriptors also confuse and mislead
- Evidence confirms use cut-offs **can't achieve 'balance of probabilities'**
- High Court concluded this process should not be used for court (Re H. 2017)

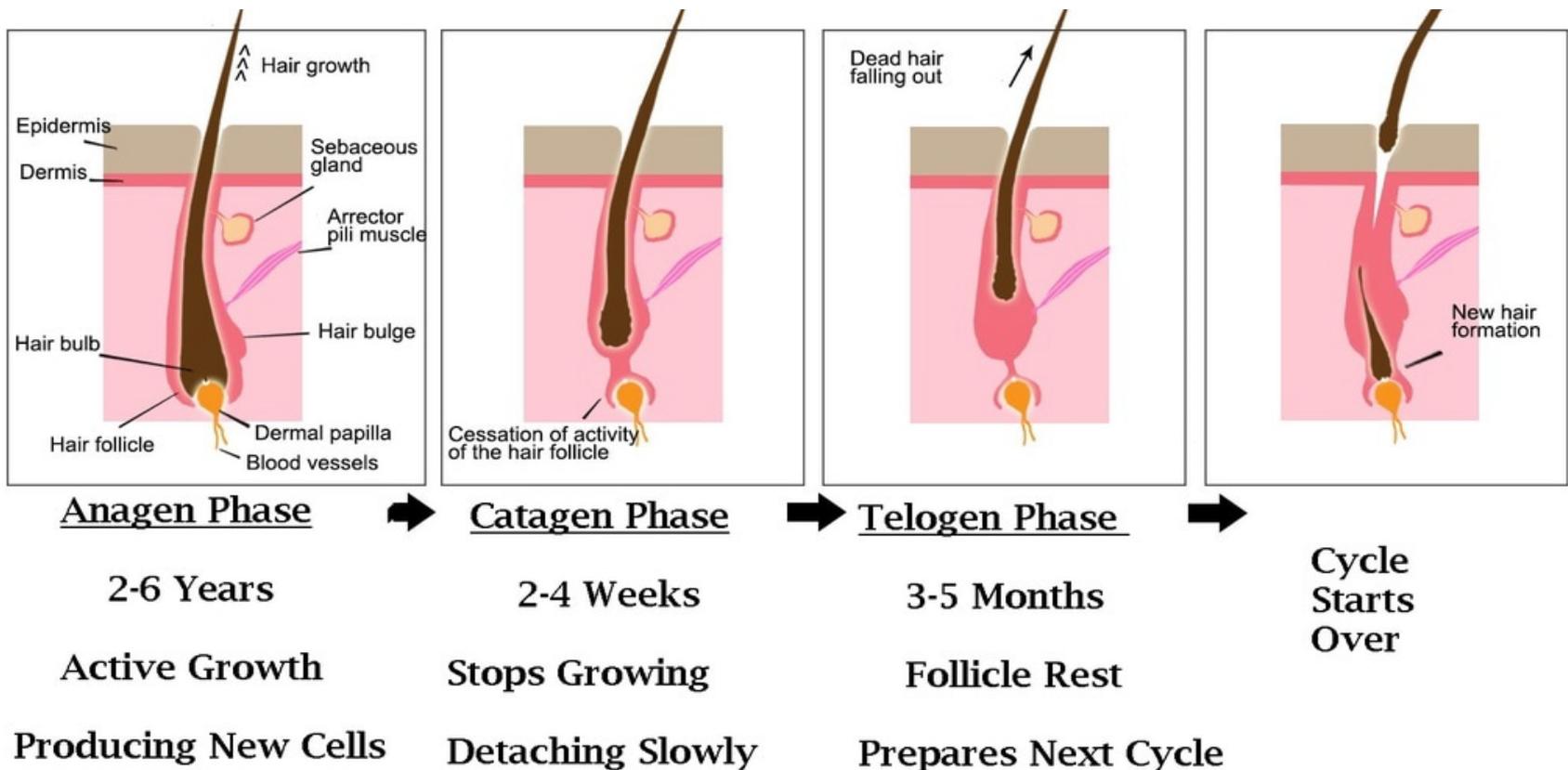


How drugs incorporate into hair



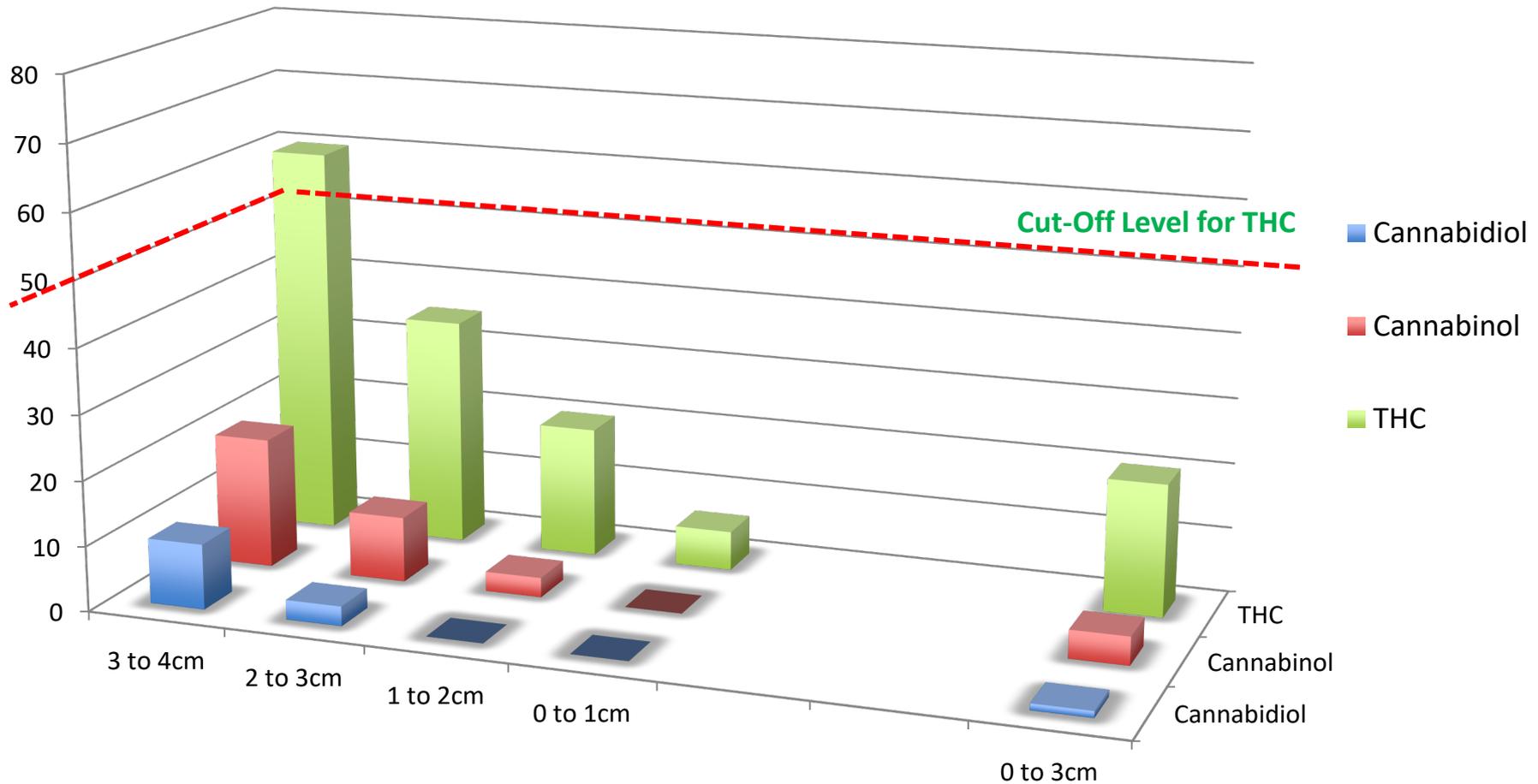


'Carry Over' - The Hair Cycle





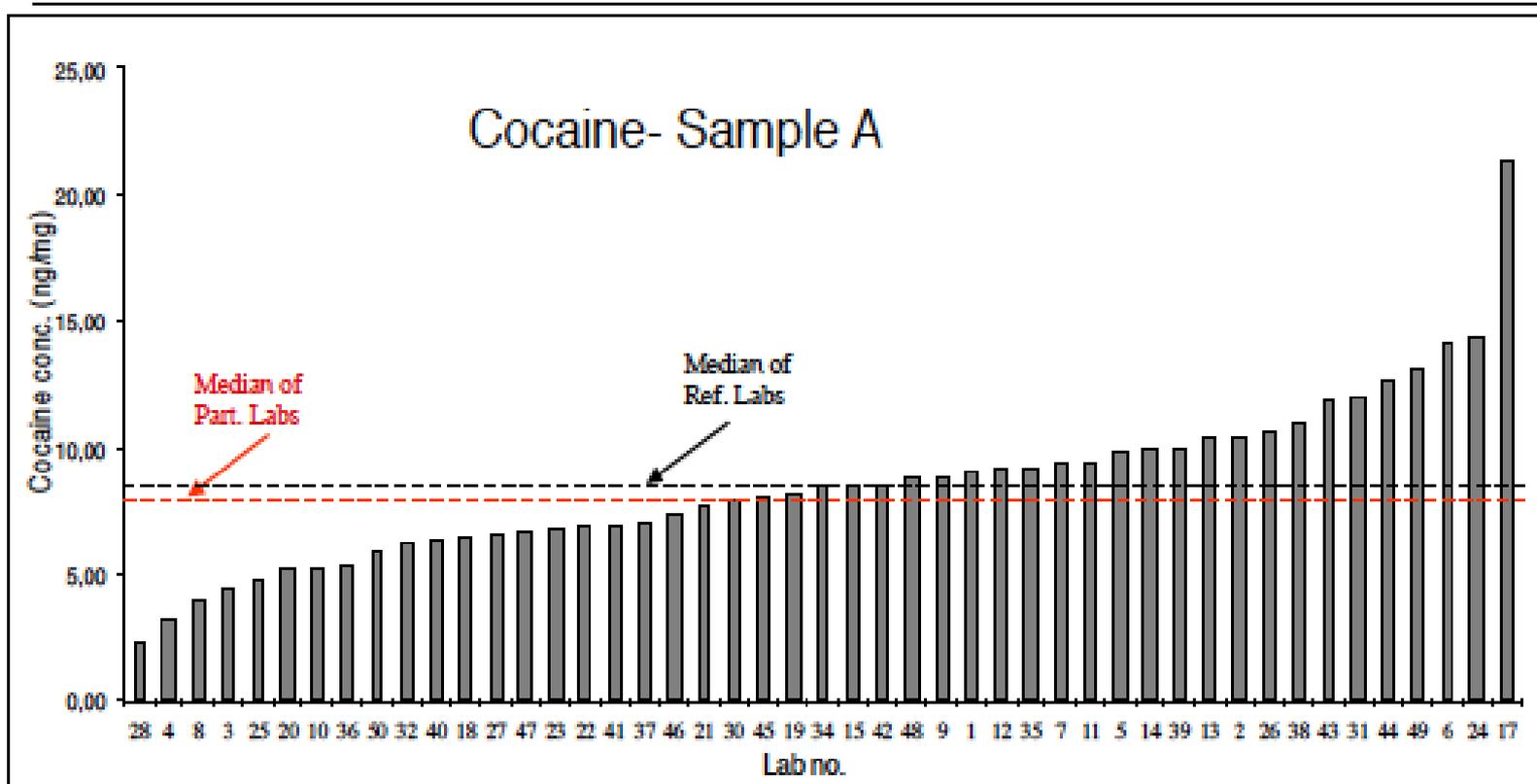
Cannabis Profile – Regular user





Variability of Lab Test Results

Different laboratories provide different results for the same samples



Society of Hair
Testing EQAS
(External Quality
Assessment
Scheme)
for Cocaine
in Hair



Hair Colour & Ethnicity Bias

Codeine Concentrations

Black
1134.0



Brown
250.8

SoHT reporting

Cut-Off 200 pg/mg

Blonde
119.6



Red
66.6

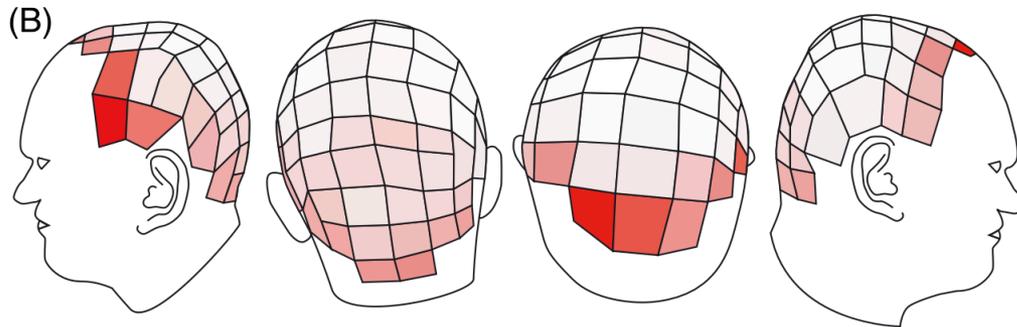
(pg/mg hair)

Testing for melanin content in each hair segment can ensure hair colour and ethnicity are accounted for in the interpretation and opinions formed in each case.

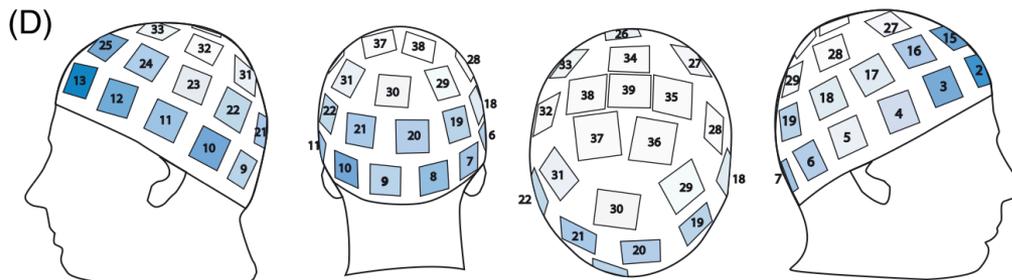


Significant Bias from Hair Collection Site - Cocaine

Distribution of **Cocaine** Levels



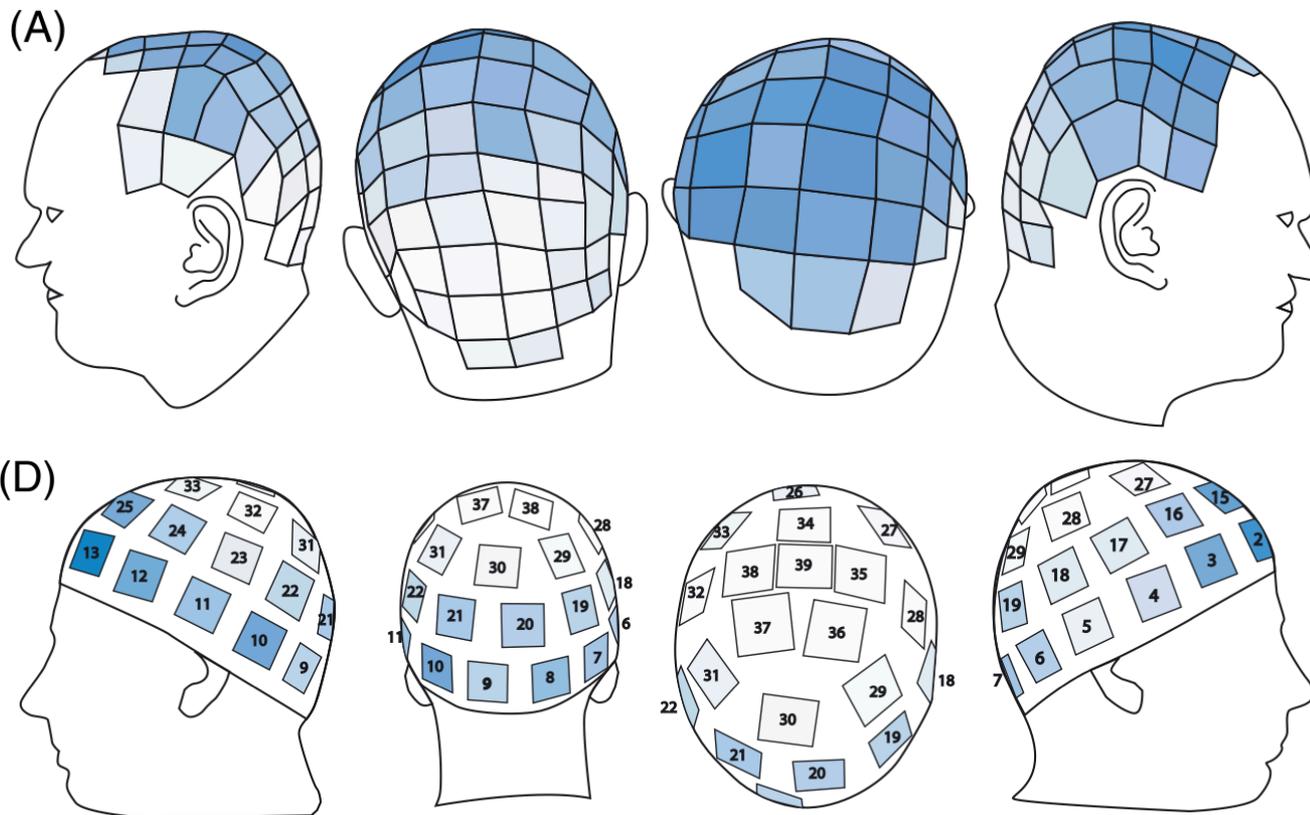
Distribution of **Sweat** levels



- Collecting hair from different areas on the scalp leads to test results having a variability of up to 105-fold difference in level reported
- Up to ~10-fold difference on adjacent sites
- Different for different drugs



Significant Bias from Hair Collection Site - EtG

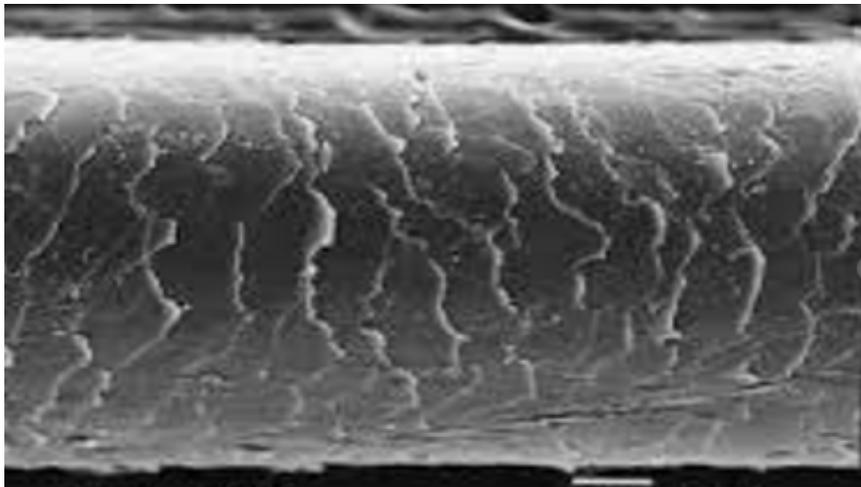


- Results above or below Cut-off depending on the site of collection
- EtG variance ranged from 2.5 to 7.5 fold differences
- Overall minimal influence from sweat



Influences - Hair Treatments

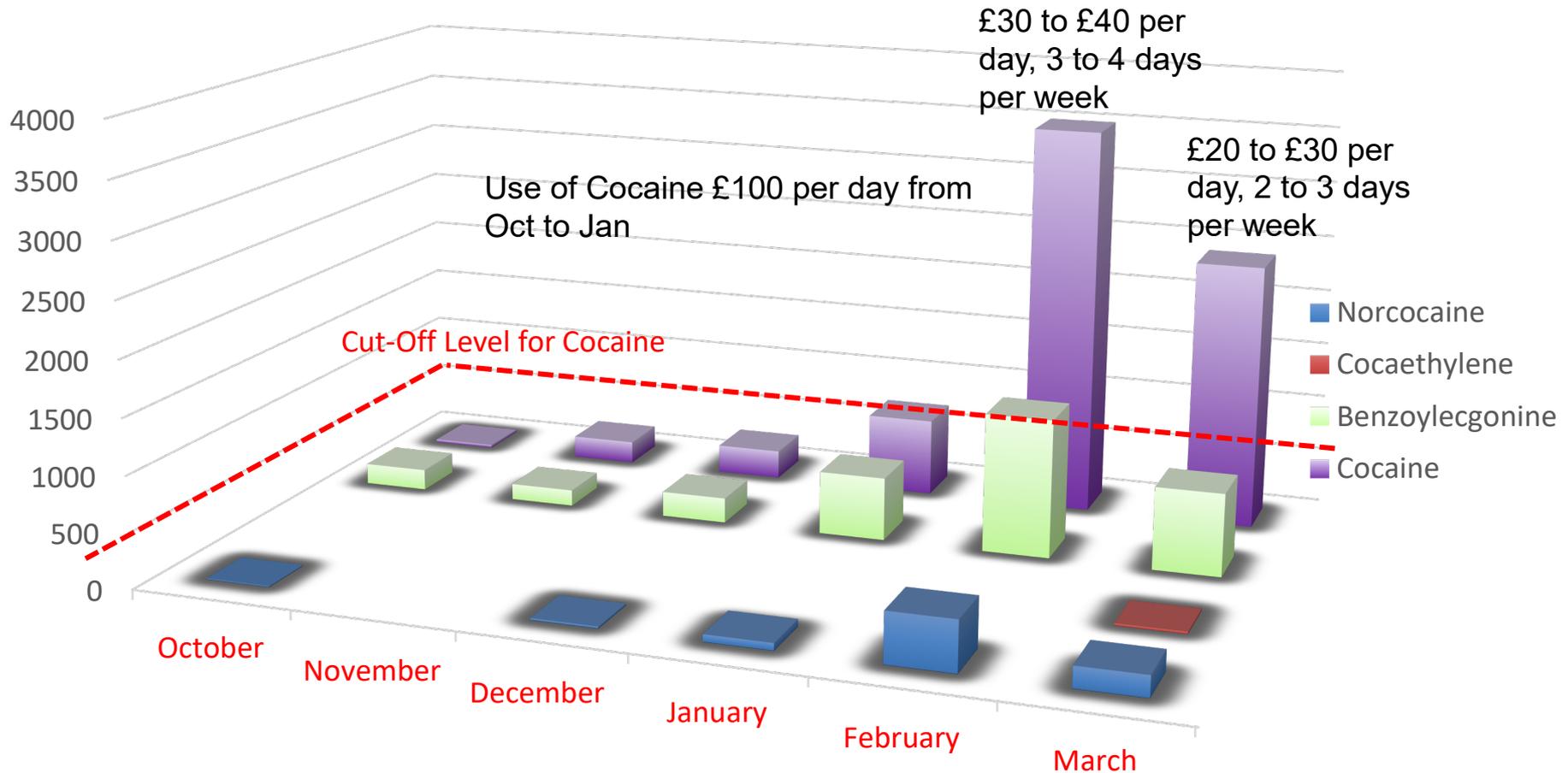
- Bleach and Permanent Hair Dye can remove up to 80% of drug from hair
- Testing for Melanin content and Oxidative markers can establish if hair is representative of drug / alcohol use



- Drugs transferred along the hair shaft
- Drug contamination absorbed into hair
- Thermal straightening hair converts Cocaine to AEME – compound associated with Crack Cocaine

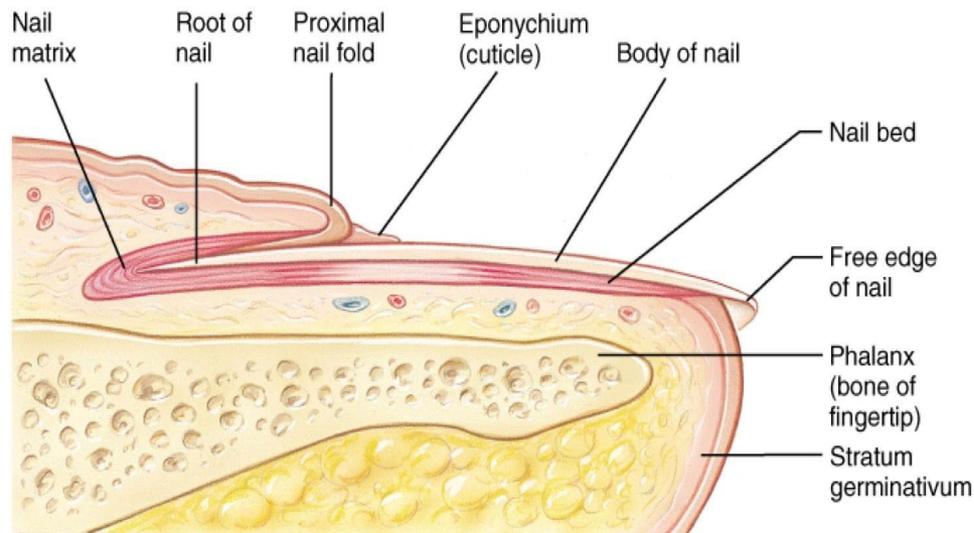


Impact of Hair Dye and Thermal Treatment





When hair compromised: Nail Clippings



- Collected in every case where available
- Used to identify **drug use** and **alcohol use** (EtG)
- No melanin so no colour discrimination like hair
- Less susceptible to passive contamination
- Drugs identified within around a few days to a week of use
- Periods calculated by length, region and growth rates
- Fingernails around 3 to 9 month history
- Toenails around 5 to 16 month history



When hair compromised: Body hair Testing

- Collected in every case where available
- Different sites - different time periods
 - Chest – around 4 to 9 months
 - Arm – around 2 to 6 months
 - Leg – around 9 to 12 months
 - Axillary (arm pit) – 4 to 9 months
- Less susceptible to passive contamination
- Sequential tests to show change in patterns of use





Chain of Evidence





Misreporting When Cut-offs used to Report

- Applying **SoHT Cut-offs** to results of ~3000 FTS hair samples from cases with known or very likely outcomes

**Industry Interpretation
would be as follows**

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



Re H (A Child: Hair Strand Testing) [2017] EWFC 64, [2018] 1 FLR 762 Peter Jackson J

- Judgment in care proceedings in which Mr Justice Jackson considers the accuracy of hair strand testing for cocaine use.
- 5 experts debated whether results represented Cocaine use **or** Passive exposure
- Debate centered on the levels of Cocaine in hair which were considered as **‘Low’**
- Experts could not agree on whether mother had used cocaine or not!!
- One Expert explained why they could not reach an agreed position and noted why:
 - *“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.”*
- However, these and other influencing factors and context were not established in this case and therefore their influence could not be considered

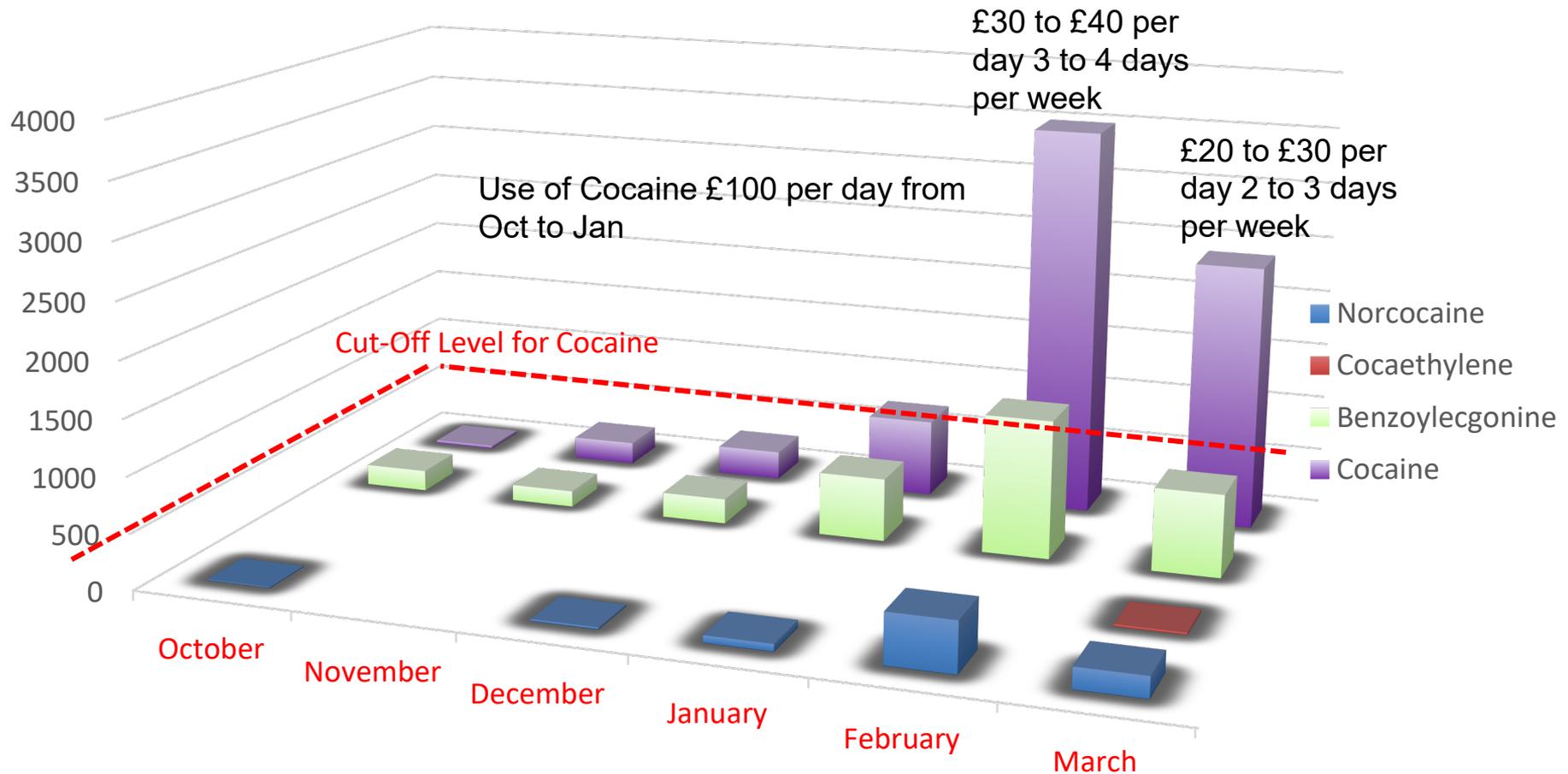


H (A Child - Hair Strand Testing) [2017] EWFC 64 Test Results for the Mother

Test date	Tester	Est. period	Cocaine range pg/mg	Be range pg/mg
7.17	DNA Legal	1.17 – 7.17 (6 cm)	520 - 110	130 - 70
7.17	Alere	1.17 – 7.17 (6 cm)	440 - 110	170 - 80
7.17	Lextox	1.17 – 7.17 (6 cm)	260 - 70	90 - 50



Impact of Hair Dye and Thermal Treatment





High Court Guidance (Re H)

- When referencing the drug levels and application of cut-offs Mr Justice Jackson provided the following guidance:

“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.”

“It would be artificial to require valid data to be struck from the record because it falls below a cut-off level when it may be significant in the context of other findings.”



Industry Response to Challenge

In a letter from Company X to solicitors and a Local Authority, when challenged on whether they follow High Court guidance Re H 2017:

- *“Whilst it has been stated by FTS that they do not apply reporting cut off levels, Company X use the reporting cut off levels recommended by the Society of Hair testing (SOHT) to identify chronic repeated use, and levels present below these cut off’s are detailed as ‘Not Detected’.*
- *Whilst it was recommended in the judgement of Re H that results below the cut off levels are reported, currently Company X do not do this. This is because Company X are requested to test the hair for evidence of **use**. Therefore, to minimise the likelihood of a result due to exposure being reported as use, Company X apply these cut off levels to evaluate the results with caution.”*



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

- This case highlighted again the misguided assumptions that HST reports represent definitive evidence, resulting in advocates only presenting a summary and not the full expert opinion leading to removal of children
- Guidance provided:

*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.

*Secondly, Re H Peter Jackson J reinforced the need for experts to **fully and faithfully** explain their findings*



T.I.A.F.T. 2019 Advice

**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.”



PLO Launch Guidance

- At the PLO relaunch Keehan J set out 20 key points including:
 - *Assessment carried out in pre-proceedings are to stand as evidence in care proceedings and are not generally to be repeated.*
 - *Every hearing must be effective* (Keehan J)



The Solution – Change the Process

- This is **opinion evidence** so engage and instruct an expert at the outset
- Provide case specific context, history and the questions issues that need to be addressed, and update the expert on new information post instruction
- Ensure expert provides guidance on P25 application to cover all processes and steps required in the investigation and testing to make certain the evidence produced is reliable, and addresses the issues in each case
- Full forensic investigation must be undertaken, and full range of samples taken along with crucial chain of evidence
- Full statement of truth must be taken from the client to establish prevailing context and influencing factors that likely impact the findings from the testing



Laboratories Must Address the Challenges

- No cut-offs used to filter results – report all findings (Re H 2017)
- More sophisticated and cost-effective testing process –
 - Cover comprehensive range of relevant / current drugs (NPS's)
 - Testing to establish if the hair is representative of drug / alcohol use
 - Testing to measure drug incorporation (melanin)
 - Highly sensitive testing – detect drugs in damaged hair, poorly incorporated drugs (Spice, Cannabis) and Red, Grey and Blonde hair
 - Additional samples (eg. more segments, body hair, nails) tested as required
 - Additional compounds including NPS's should be notified without cost and reported when required and instructed



Reporting Requires Data

- Comprehensive previous data used and sophisticated data collection and processing tools applied to achieve balance of probabilities
- For FTS this involves utilisation of AI and ML tools which provides highest statistical significance for each opinion which is captured in Expert Rule systems for reporting
- Process continually improves strength, reliability and utility of evidence
- Provides consistency between experts
- Produces balanced evidence to assist in understanding where this is positioned in context with other knowledge and evidence in the case to assist decision making



Balanced Evidence Supports Decision Making

The Parliamentary Review

BEST PRACTICE REPRESENTATIVE

- When presenting this evidence, the expert opinions must be balanced, **not** binary
 - More likely than not – Very likely – Extremely likely
 - More likely opinion balanced with possible but less likely explanation[s]
 - Equally likely scenarios providing 2 or 3 possible explanations
- In all cases where evidence is inconclusive, guidance is provided
 - Recommendations given on further testing and investigation required to enable a final opinion to be provided that achieves balance of probabilities
 - The likelihood of the recommended work achieving an opinion that is 'more likely than not' or that it would strengthen the evidence is also provided for informed decisions to be made in terms of proportionality and cost



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Drugs and Alcohol

Are these a factor in the parent's ability
to provide a safe environment for the child?

Thank you for listening



Novel Psychoactive Substances

- UK is Europe's biggest market for NPS compounds
- New substances constantly been developed and introduced
- Presents a significant challenge for detection and monitoring
- FTS work with **MANDRAKE** 'early warning' group to identify new substances so new tests can be introduced
- Presently 4 main groups of NPS compounds of concern
 - **Synthetic Opioids**
 - Synthetic Cannabinoids (Spice compounds)
 - Stimulants and Hallucinogen's
 - Designer Benzodiazepines





Synthetic Opioid - Nitazines

- Taliban stopped opium production May 22, Afghanistan >95% reduction in opium production - which supplies ~85% of the European heroin
- **Nitazenes** (Protonitazene, Metonitazene) 50 to 250 x more potent than Heroin and are causing accidental overdose and deaths in several areas across the UK
- **National Crime Agency** earlier this year reported **65 deaths** from Nitazenes over 6 months, which is likely just the tip of the iceberg
- **20 fatal overdoses** in South Worcestershire area alone from Nitazenes
- **Deaths in Teesside and Birmingham** from Nitazines has prompted doctors to warn patients of increased risk of overdose and death
- Nitazenes found mixed with heroin tablets and powder





'Spice' NPS Compounds

- Synthetic cannabinoids – mimic cannabis
- **32** different synthetic cannabinoids reported by FTS, but constantly changing. 9 common presently, latest additions are:
 - ADB-BUTINACA, MDMB-4en-PINACA, 5F-emb-PICA and new compounds INACA? and HEXANACA?
 - Used in combination with Cannabis as minor or major constituent
 - **d8 -THC** a new form of cannabis produced from CBD oil, avoids detection with conventional cannabis testing in Hair





Other NPS Compounds

- Stimulants and Hallucinogen's (Cathinones, Piperazines)
 - 15 identified: **Monkey Dust** presently a major concern
 - **Monkey Dust** is highly potent cathinone – 'Zombie drug'
 - White powder, snort, smoke or inject, effects similar to cocaine and MDMA, popular as its cheaper and triggers longer highs
 - Life-changing impact: aggression, violence, paranoia, psychosis,
 - Changing compound from **MDPV** → **α-PV** → **MDPHP**
- Designer Benzodiazepines/Tranquilizers
 - Bromazolam and etizolam sold on street as diazepam (Valium) and alprazolam (Xanax) – avoids detection!!
 - Abused in combination with heroin and other opioids
 - Xylazine – potent tranquilizer used in veterinary

